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Base price includes:

- Intel® Pentium® III Processor, 700 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 20.0 GB (7200 rpm) UltraDMA Hard Drive[1]
- 10X DVD-ROM Drive[2]
- Creative Annihilator 32 MB w/GeForce256 Grap
- Sound Blaster™ Live! Value PCI Audio
- 6.0Mb Max Digital DSL Modem[4]
- JBL Pro Premium Speakers w/Subwoofer
- Digital Creativity Imaging Center[6]
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- Microsoft Windows®98
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- Klipsch v.2 -400 Watt Speaker System: Add $24
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Base price includes:

- Intel Mobile Pentium III Processor, 500 MHz
- 15.0" TFT Active Matrix Display
- 96 MB SyncDRAM
- 6.0 GB UltraDMA Hard Drive[1]
- CD-RW Drive[7]
- ATI Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory
- 56K ITU V.90 Modem (PCI)[3]
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- 256 KB Integrated "On-chip" cache
- 10/100 BaseT Ethernet Network Card
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- Mobile Auto Adapter: Add $99

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PRESARIO 5700T-600E INTERNET PC	PRESARIO 5700T-600E INTERNET PC	PRESARIO 5700T-500 INTERNET PC	PRESARIO 5700T-500 INTERNET PC
Intel Pentium III Processor, 600E MHz	Intel Pentium III Processor, 600E MHz	Intel Pentium III Processor, 500 MHz	Intel Pentium III Processor, 500 MHz
128 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB
20.0 GB (7200 rpm) UltraDMA Hard Drive[1]	13.4 GB (7200 rpm) UltraDMA Hard Drive[1]	13.4 GB (7200 rpm) UltraDMA Hard Drive[1]	13.0 GB UltraDMA Hard Drive[1]
10X DVD-ROM Drive[2]	10X DVD-ROM Drive[2]	32X Max CD-ROM Drive[5]	32X Max CD-ROM Drive[5]
3Dfx Voodoo 3 3500 16 MB 2X AGP Graphics	3Dfx Voodoo 3 3500 16 MB 2X AGP Graphics	3Dfx Voodoo 3 1000 2X AGP Graphics Card w/16 MB	3Dfx Voodoo 3 1000 2X AGP Graphics Card w/16 MB
Sound Blaster Live! Value PCI Audio	Sound Blaster Live! Value PCI Audio	Creative Labs 1373 Audio	Creative Labs 1373 Audio
6.0Mb Max Digital DSL Modem[4]	56K ITU V.90 Modem[3]	56K ITU V.90 Modem[3]	56K ITU V.90 Modem[3]
JBL Pro Premium Speakers w/Subwoofer	Klipsch v.2 -400 Watt Speaker System	JBL Pro Amplified Speakers	JBL Pro Amplified Speakers
Digital Creativity Imaging Center[6]	Digital Creativity Imaging Center[6]	Digital Creativity Imaging Center[6]	Digital Creativity Imaging Center[6]
10.0 Mbps Home Phoneline Networking Card[10]	Microsoft Featured Home Collection & MS Word	10.0 Mbps Home Phoneline Networking Card[10]	Microsoft Featured Home Collection & MS Word
4X CD-RW (Read/Writeable) Drive[7]	Microsoft Windows98	Microsoft Featured Home Collection & MS Word	Microsoft Windows98
MS Featured Home Collection & MS Word + Windows98	Compaq CV715 17" Monitor (16.0" VIA)	Microsoft Windows98	Compaq CV515 15" Monitor (13.8" VIA)
Compaq CV715 17" Monitor (16.0" VIA)		Compaq CV715 17" Monitor (16.0" VIA)	
$1999‡ As low as **$56 per mo.†**	**$1799‡** As low as **$51 per mo.†**	**$1399‡** As low as **$39 per mo.†**	**$1199‡** As low as **$34 per mo.†**
Klipsch v.2 -400 Watt Speaker System: Add $249	4X CD-RW (Read/Writeable) Drive[7]: Add $199	4X CD-RW (Read/Writeable) Drive[7]: Add $199	IJ750 Color Inkjet Printer: Add $149
Compaq CV915 19" Monitor (18.0" VIA): Add $200	Compaq CV915 19" Monitor (18.0" VIA): Add $200	Compaq CV915 19" Monitor (18.0" VIA): Add $200	Compaq CV715 17" Monitor (16.0" VIA): Add $70
Agfa Snap Scan USB Scanner: Add $129	20.0 GB (7200 rpm) UltraDMA Hard Drive[1]: Add $108	Intel Create and Share USB Camera Pack: Add $79	Intel Create and Share USB Camera Pack: Add $79

PRESARIO 1800T-500 INTERNET NOTEBOOK PC	PRESARIO 1800T-450 INTERNET NOTEBOOK PC	PRESARIO 1800T-450 INTERNET NOTEBOOK PC	PRESARIO 1900XL-500 INTERNET NOTEBOOK PC
Intel Mobile Pentium III Processor, 500 MHz	Intel Mobile Pentium III Processor, 450 MHz	Intel Mobile Pentium III Processor, 450 MHz	Intel Mobile Pentium III Processor, 500 MHz
14.1" TFT Active Matrix Display	15.0" TFT Active Matrix Display	14.1" TFT Active Matrix Display	13.3" TFT Active Matrix Display
64 MB SyncDRAM	96 MB SyncDRAM	64 MB SyncDRAM	64 MB SyncDRAM
10.0 GB UltraDMA Hard Drive[1]	6.0 GB UltraDMA Hard Drive[1]	6.0 GB UltraDMA Hard Drive[1]	12.0 GB UltraDMA Hard Drive[1]
6X DVD-ROM Drive[9]	6X DVD-ROM Drive[9]	24X Max CD-ROM Drive[8]	6X DVD-ROM Drive[9]
ATI Rage LT Pro Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory	ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory
56K ITU V.90 Modem (PCI)[3]	56K ITU V.90 Modem (PCI)[3]	56K ITU V.90 Modem (PCI)[3]	56K ITU V.90 Modem (PCI)[3]
Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery	Ultra Hi-Capacity Lilon Battery
256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache	256 KB Integrated "On-chip" cache
10/100 BaseT Ethernet Network Card	10/100 BaseT Ethernet Network Card	10/100 BaseT Ethernet Network Card	Microsoft Featured Home Collection
Microsoft Featured Home Collection + Windows98	Microsoft Featured Home Collection + Windows98	Microsoft Featured Home Collection + Windows98	Microsoft Windows98
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128 MB SyncDRAM: Add $200	192 MB SyncDRAM: Add $200	6X DVD-ROM Drive: Add $150	Compaq Global II Case: Add $79
18.0 GB UltraDMA Hard Drive[1]: Add $300	CD-RW Drive[7]: Add $150	96 MB SyncDRAM: Add $100	APC Notebook Surge Protector: Add $29
Extra Ultra Hi-Capacity Lilon Battery: Add $129	Extra A/C Adapter: Add $49	Extra A/C Adapter: Add $49	QuikDock w/Integrated Ethernet: Add $129

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PRESARIO 5700N-466
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- 64 MB SyncDRAM, 4 MB Shared for Video
- 10.0 GB UltraDMA Hard Drive[1]
- 32X Max CD-ROM Drive[5]
- 2X AGP w/64-bit Hardware Accelerated 3D Graphics
- ESS Solo PCI Audio
- 56K ITU V.90 Modem[3]
- JBL Pro Amplified Speakers
- Creativity Action Center
- Microsoft® Featured Home Collection & MS® Word
- Microsoft Windows®98
- Compaq CV515 15" Monitor (13.8" VIA)

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- APC Back-UPS Pro Office 280: Add $89

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INTERNET NOTEBOOK PC

- Intel Mobile Pentium® III Processor, 450MHz
- 12.1" TFT Active Matrix Display
- 64 MB SyncDRAM
- 6.0 GB UltraDMA Hard Drive[1]
- 6X DVD-ROM Drive[9]
- ATI Mobility Hardware Accelerated 3D Graphics with 8 MB Video Memory
- 56K ITU V.90 Modem (PCI)[3]
- Hi-Capacity Lilon Battery
- 256 KB Integrated "On-chip" cache
- Microsoft Featured Home Collection
- Microsoft Windows98

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- Extra A/C Adapter: Add $49
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- Extra Ultra Hi-Capacity Lilon Battery: Add $129

And that's not counting all the goodies you can add on. Like Home Phoneline Networking,[10] which lets the entire family surf the Net at the same time. Super-fast DSL modems, so when DSL service comes to your area, you'll be able to surf at lightning speed. Plus, you can add an Ethernet port to make your PC cable and satellite modem ready.

Yet there's even more to whet your appetite.

If your wish list includes playing games with mind-blowing 3D graphics, you can upgrade to a next-generation DVD-ROM drive. Capture, edit, and publish high-quality digital movies and still images with the Digital Creativity Imaging Center.[6] Get the latest in removable storage with an Iomega Zip Built-In™ Drive or CD Read/Writeable Drive.[7] In fact, whatever you want out of a computer, we can put into it.

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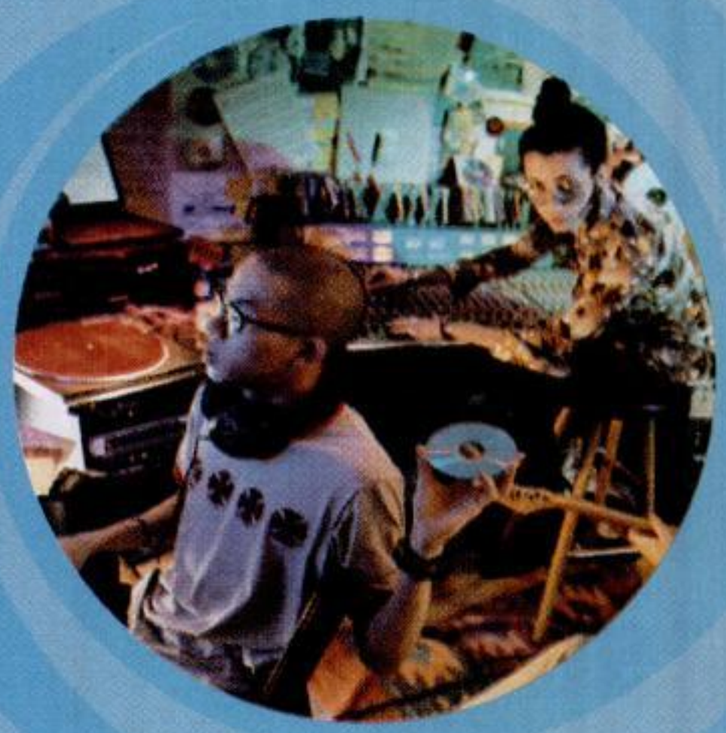

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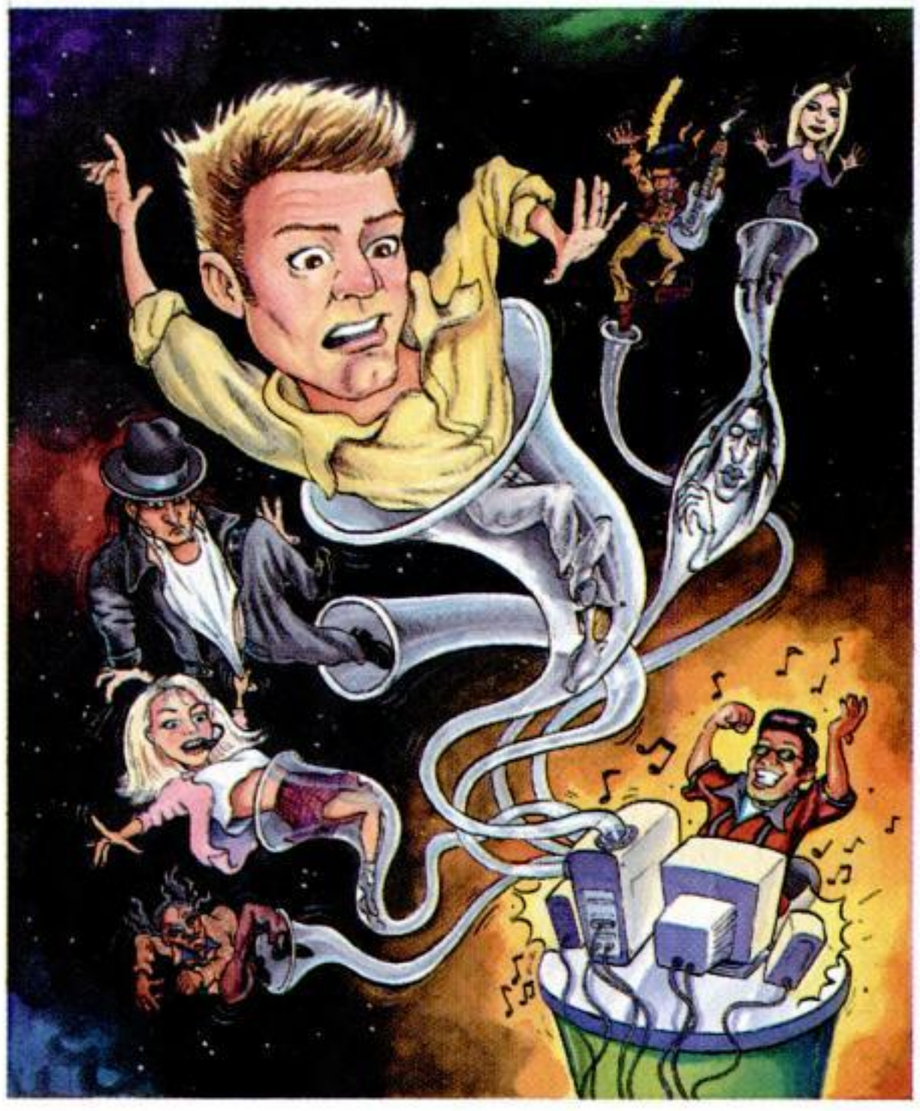
MAXIMUM PC

► FEBRUARY 2000

40 MP3 Guide

It seems every power user on Earth is obsessed with downloading and playing as many MP3s as possible. These highly compressed music files are changing the way we use the Internet—and landing some folks in a whole lotta trouble. We show you the best ways to make, find, and play MP3s, and even give you tips on burning your tunes to discs. Now, please stay clear of the downloading tubes. Their suction strength is amazing.



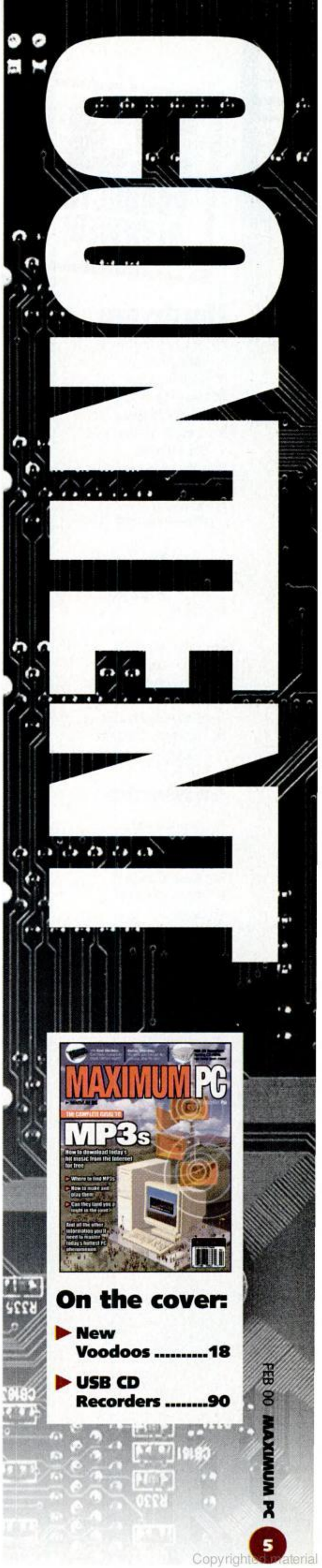
54 Online Trading

Who wants to be a millionaire? Bryan Del Rizzo does, and he's investing his money online in order to reach his goal. You too can save yourself a pretty penny by cutting pesky, money-grubbing brokers out of the equation—but you better know what you're doing, or else you'll end up like one of those "poor house guys" who has to wear a barrel for clothing. Bryan reveals all about online trading.

64 The Sexy Type

Wanna pretty up your static web site? Well then, it's time to get animated. Dressed in possibly the most disturbing costume every to grace the *Maximum PC* offices, Geoff Visgilio gets gussied up like Pamela Anderson Lee to help you perform cosmetic surgery on your drab old fonts. Oh, the humanity!

COVER ILLUSTRATION BY RON MCPHERSON



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13 Comm Port
We received thousands of e-mails last month, but the best always rises to the top. Write an intestesing letter; get an interesting response.

33 Fast Forward
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35 Net Sensei
Party girl **Sherry Monarko** shows you how to use the web to raise the roof in the privacy of your own home. Come on over for chapati.

37 Game Theory
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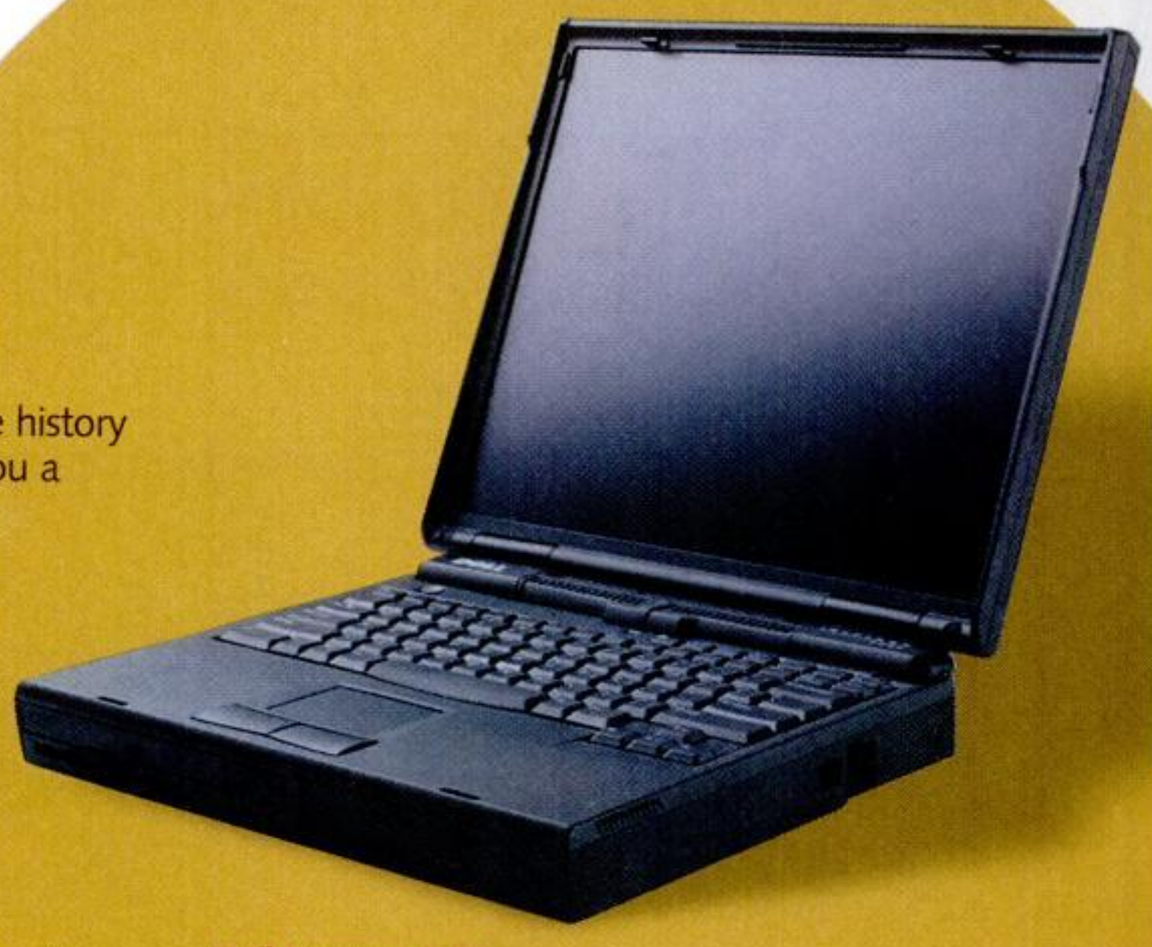
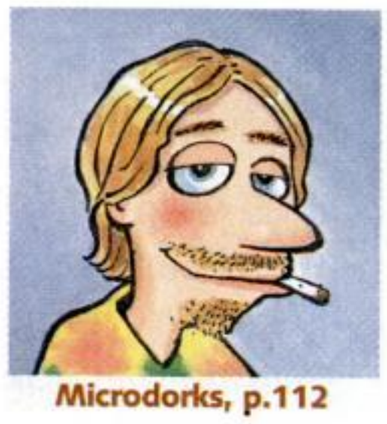
112 Glitch
Forget about the stupid paperclip. We've got the deets on the Microsoft Office Assistants that were deemed too controversial to be included with the final release.



Dell Inspiron, p.88



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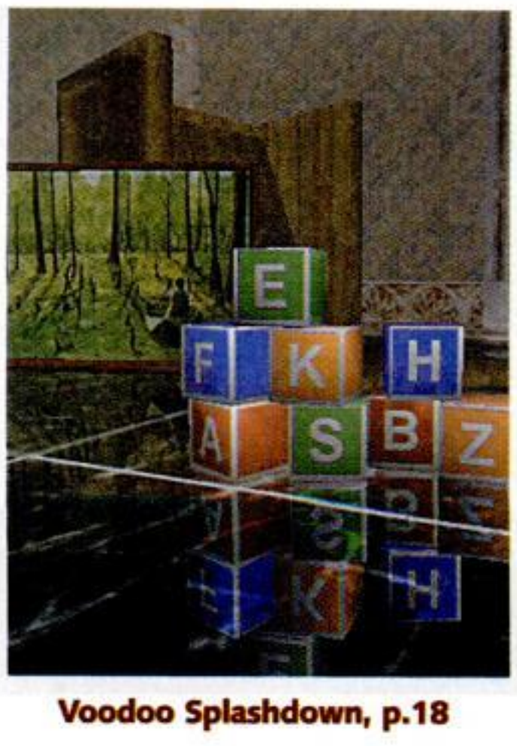
▶ NEWS

18 Inside Sources

PC Previews, News, and Factoids

▶ 3dfx has stacked the deck with the multi-chip Voodoo5 line of videocards. Not only do the cards do fancy T-buffer special effects, they also hit phenomenal fill rates. But the new breed of Voodoo is more of an answer to last year's limitations than this year's innovations.



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▶ **Spin Cycle:** Booting once, booting twice, new P-III bug infects PCs, Feds kick broadband into high gear.

▶ TECH FILES

25 Watchdog
If a company messes with a bull, it gets the horns. The "bull" is you, and the horns are The Dog. Find out who's in the dogpound.

75 Lab Notes
We test 3D videocards to see how they affect performance in regular old 2D applications.

79 Ask the Doctor
Rip the heatsink off your videocard, find the fax with Windows 98, and more. The Doctor's instruments are warmed up, so don't be shy.

110 Terminator
Is it blue? Find out why.

▶ PRODUCTS

29 Peripheral Vision
High-tech toys on the PC periphery. This month we look at an LCD projector that can power a home movie theater; a PC-powered radio that plugs into your USB port; and a handy device that connects your digital camera directly to a printer.

InFocus Projector, p.29

83 Reviews
We checked out a system from some airplane company, **Falcon Northwest.** Some games are included too; ever hear of **Quake III: Arena** and **Unreal Tournament**? We didn't think so. For the few system builders out there, we've got **Athlon motherboards**, **USB CD-RWs**, removable storage, and speakers. It's not a car, but we reviewed a **Viper II**, and threw in a **Dell** laptop, and **Canvas 7** for all the web people (if you're into that).

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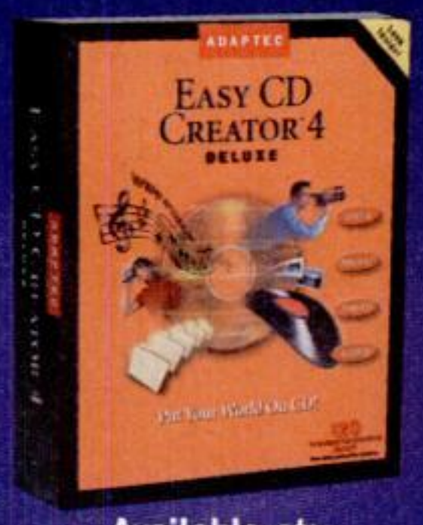

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EDWORD

Secrets of Our Lab Revealed!

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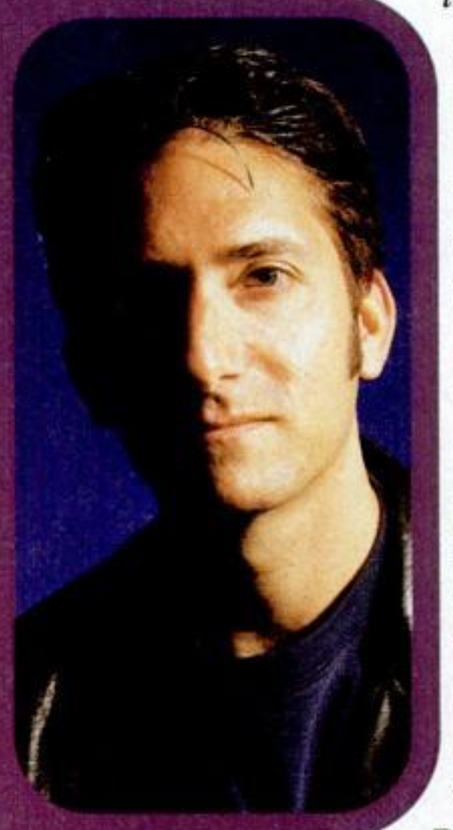

What dangers await the unsuspecting visitor to the Maximum PC Lab? The answer depends on which editor's workbench you visit first. Some benches are neat and orderly, while other benches are stacked high with precarious columns of component boxes. Pull any single box from its dubious lodging and you may be buried by an avalanche of PC innovation.

If you've ever seen news editor Gordon Ung's work bench, you know exactly what I'm talking about. Overrun with random CPUs, motherboards, and cooling devices, Gordon's bench looks like a heart-wrenching advertisement for the "Save the Silicon" foundation: "Here we see indisputable evidence of brutal PC testing and tinkering. This CPU has been systematically over-clocked, *three bins* past its rated frequency. This orphaned computer has been fully disassembled and traded away, piece-by-piece, to other editors. Warning: The images we are about to show of gutted hard drives may not be suitable for younger viewers…"

Here we see indisputable evidence of brutal PC testing and tinkering.

Other workbenches look innocent enough, but, rest assured, the editors who claim them are up to no good. Reviews editor Josh Norem, for example, is notorious for his speaker-testing antics. Step One: Hook up insanely loud speaker set. Step Two: Insert "Butt Booty Bass, Volume II" CD into drive tray. Step Three: Turn volume to "11." Step Four: Dance the Tootsie Roll, Cabbage Patch, or Da Dip, depending on mood. Step Five: Induce nervous breakdown in the woman who works in the lawyer's office, one floor above.

Senior editor Bryan Del Rizzo, a.k.a. Chief Bagogo, is probably The Lab's quietest technician—but his guarded demeanor is at least as disturbing as Josh's experiments in subsonic warfare. For the past few weeks, Bryan has been preparing to leave *Maximum PC* for his new job as editor-in-chief of Maximum Linux. During this period, he's supposedly been "briefing" Geoff "The New Guy" Visgilio on the fine art of notebook benchmarking—but we have no idea of what's really going on between these two dudes after hours, when The Lab's door is closed. Do we really want to know the details? Probably not. But suffice it to say, in comparison to the weirdness all the other guys wreak in The Lab, my monitor testing looks positively saintly.

In the interest of security, I can't reveal too many details about The Lab's infrastructure, layout, or contents. But I can share the following: We have eight workbenches total, and each is large enough to host two fully configured desktop systems. Each workbench is equipped with an Ethernet feed, an analog phone line, and eight grounded power outlets.

The Lab's floor is made of linoleum to help control general static, and an anti-static mat greets every visitor who enters. The mat is especially important for departments editor and videocard reporter Sean "Sparky" Downey, who seems to have developed some kind of bizarre electrochemical thing that makes him prone to kinetic flare-ups. The Lab is also climate-controlled to stay at an oddly frigid 70 degrees Fahrenheit. This is necessary to ensure that all systems and components run as cool as possible.

Finally, The Lab is equipped with a 24-hour surveillance camera so that *Maximum PC* editors can constantly monitor the activity that occurs inside. And you thought the "Lab Cam" was broken…

—Jon Phillips, editor-in-chief

MAXIMUM PC

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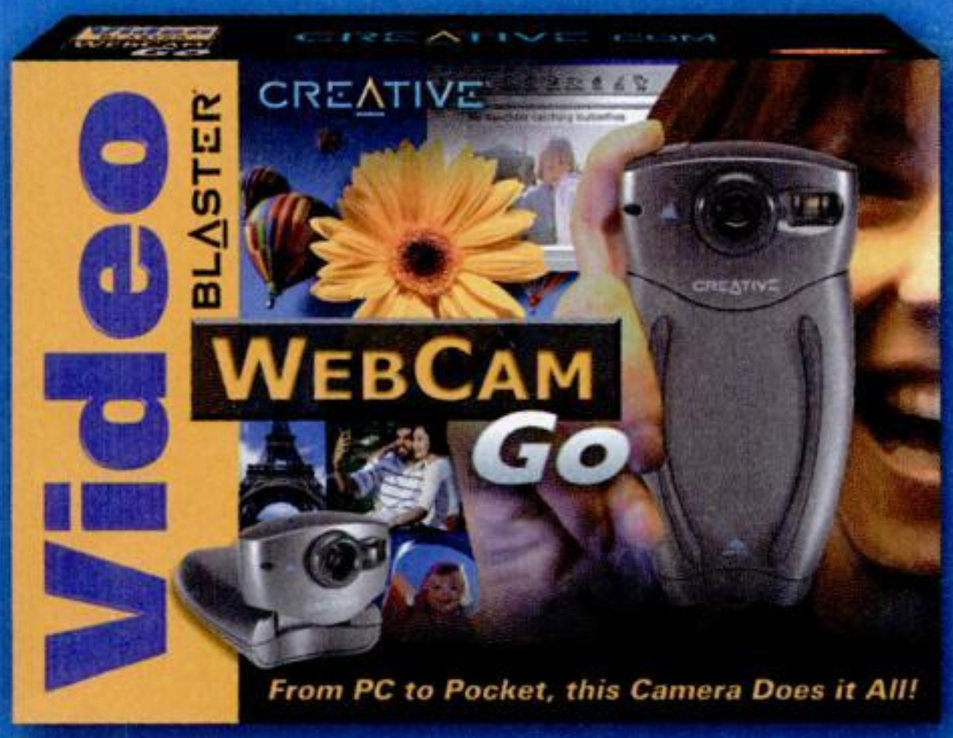

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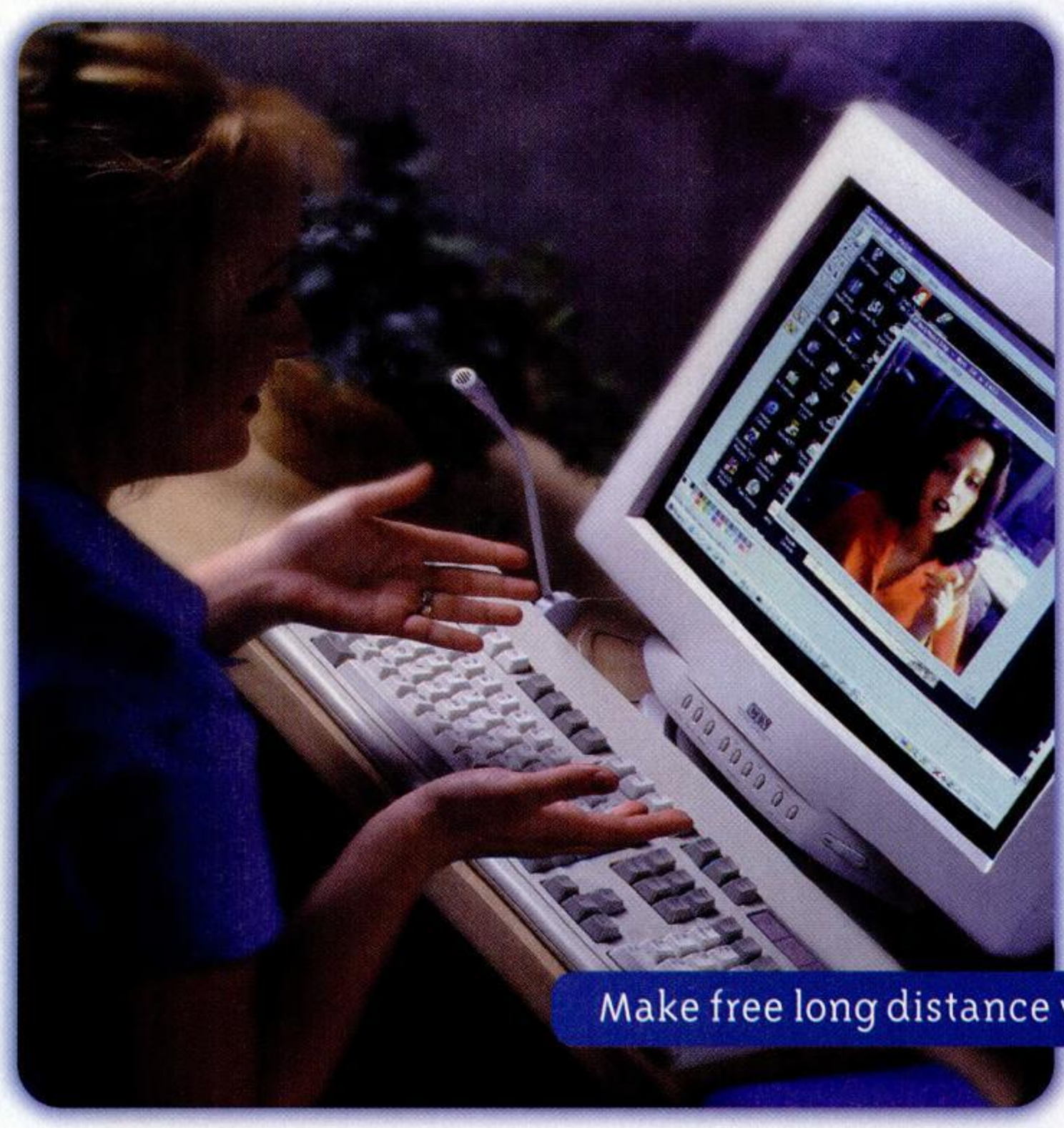

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Reader Advisory: We Are Not Tree-hugging Symps

Oh, how the e-mail flowed last month! For some reason, just a smattering of readers wrote in to debate our Gear of the Year choices. Instead, the majority of the mail avalanche responded to our anti-game packaging exposé, and Jon's turn-of-the-millennium Edword column.

Regarding the game packaging story: We're not a bunch of lefty-crunchy environmentalists. We simply believe that the PC gaming industry is ignoring an easy, painless way to simultaneously help the environment and save consumers money. Read the full explanation below. Regarding Jon's column: Anyone lamenting the public's misperception of when the next millennium begins needs to find more important matters to get frothy over. Do the millennial purists have a valid argument? Yes. Will anyone care come Jan. 1, 2000? No. We nonetheless respond below to this quixotic furor.

Finally, we choose a particularly prickly Reader of the Month. His name is William Fenton, and we congratulate him for the consistency of his abusive correspondence. Of the December issue he wrote, "It is OK to have one, or even two, issues as uninteresting as the one I just got, but if this keeps up, you will lose me as a subscriber... In the past there have been some great issues and some mediocre issues. This one is terrible."

When we asked Fenton to define what was so bad about the December issue, he unleashed a long list of complaints, most of which were too "Fenton-centric" to help us better refine a magazine published for more than 300,000 readers. But we'll tell you one thing: We have to admire the moxie and talent of a guy who can write such a thoroughly unrelenting series of hate letters. We encourage all readers—even the William Fentons of the world—to share their opinions about the magazine. Every little bit of insight has the potential to help.

Save Paper? Bah!

Dear Mr. Del Rizzo: I am employed as a "digester operator" in a pulp mill in Hinton, Alberta, Canada. I cook trees for a living. For every tree we cut down, two are replanted. Last year, we re-planted our 100 millionth seedling tree. We operate our pulp mill in a very environmentally safe and responsible manner.

In your December article, you refer to game boxes as "ridiculous packaging." Personally, I like game boxes. If they are well designed, they will convey the spirit of the game to the potential owner. The game box also serves as protection for the product inside. It aids in shock resistance for the brittle jewel case, and provides crush resistance for registration cards and paper manuals.

Your magazine is printed on lightweight paper, drenched in fast-drying ink, and wrapped safely in a plastic bag containing a plastic sleeve and plastic CD. Would you like to have your packaging critiqued as harshly? Your packaging is sound protection for a product that you are very proud of. The gaming industry has a right to be proud of its products as well.

—Mark MacDougall

PC Power Demons: Please, do not start flacking for soporific left-wing agitation groups. Forgetting the fact that most paperboard packaging is made from "post-consumer" waste—that is, it's recycled from what might be sitting in a landfill anyway—you miss the big point that the market will arrange all economic factors for maximum efficiency.

When, or if, fat packaging becomes a drag on the economic activity of software sales, then companies will weigh that into their pricing mechanisms. Pinheaded market/cost analyses done by left-wingers who have little or, usually, no business experience are always misleading.

You want to talk "pollution"—think of all those (unrecyclable) AOL disks that are on their way to the dump the week after the latest issue of *Maximum PC* arrived. And it is important to note that in those jewel boxes, there is no room for a decent manual. A lot of programs these days need hefty manuals. Nothing peeves me more than having to download or print out a manual.

—Brett Moss

Pinheaded market/cost analyses done by left-wingers who have little or, usually, no business experience, are always misleading.

Dear Bryan: I understand your anger concerning the fact that PC software makers use huge boxes to contain small CDs. However, unlike music, software is a visual item, not something you listen to like music. That is why music can succeed without flashy boxes.

—Scott Brennan

Editor-in-chief Jon Phillips responds: Poor Bryan. Everyone thinks he's the man behind the "tree-hugging propaganda." In fact, the story was my idea. The truth is, we're only armchair environmentalists, because we do in fact publish a magazine bundled in a plastic bag, and unabashedly so. In most cases, we have no problem with the ways in which businesses market their essential products, even when their methods are a little environmentally unfriendly. We *do* have a problem, however, when a business ignores pro-environmental opportunities that would have no ill effect on sales.

Our basic products are a printed-paper magazine and a plastic disc, bundled together in a plastic bag.

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This package is as streamlined as it possibly can be. To ditch the paper would effectively mean ceasing publication, and to ditch the bag would mean more stolen discs and less marketing sizzle on the newsstand. It should be noted that readers pay very little for our printing and packaging; our advertisers bear this brunt (meanwhile, I have never seen a third-party electronic ad appear within a game, or a third-party print ad appear within a game box).

By following the lead of the console game and audio CD companies, PC game companies, unlike magazine publishers, are in a unique position to effect a positive change. One of our readers points out that games are a visual item, and therefore need the marketing hype that a box provides. We don't buy this argument, because console games sell very well when displayed on store shelves in simple jewel cases. This presentation strategy not only cuts down on environmental waste and marketing costs that are passed on to the consumer, but also allows more games to be displayed for sale (we have always been irked by the scant number of titles actually available at big megastores like CompUSA).

The bottom line: We don't begrudge PC game companies the right to market their wares and include nice, big paper manuals. We simply want the companies to scale their packaging down to a size commensurate to the paper manuals, and eliminate paper boxes altogether if the manual can fit inside the jewel case itself.

Who can say that passing that 60-second mark wasn't a watershed event?

Gerard "Gets It"

The article you did on the wastefulness of game producers really chapped my ass. I'm not an evironazi, but I do my part, and get really pissed when I see something like this. Bravo for the burn-down. Blow the lid off this mutha, and burn down their practices. Rock on!

—Gerard M. Brown

Y2Korrection

I have a comment on Jon Phillips' editorial in the December 1999 issue. He opens with this sentence: "Welcome to the last *Maximum PC* of the second millennium." This is incorrect.

The Gregorian calendar reckons time relative to the birth of Jesus, and begins with the year 1 A.D. There was no "year 0." So, the first millennium was from 1 to 1000, and the second millennium is from 1001 to 2000. The next millennium is from 2001 to 3000. So, contrary to the ignorance of the American public and the news media that promotes it, the next millennium does not start until 12:00 a.m. on January 1, 2001. You will have 12 more issues in this, the second millennium.

For a good in-depth explanation, you can visit the U.S. Naval Observatory's web site at **www.usno.navy.mil**.

—Michael Jones

Editor-in-chief Jon Phillips responds: Michael's letter was relatively polite compared to all the other e-mails addressing exactly the same subject (lobbyists for millennial accuracy are a surprisingly aggressive bunch). Let me point out that I called the new millennium an "*arbitrary* fulcrum point of time and history." Not only do we base millennial hype on a religiously exclusive calendar, there's also much debate as to exactly when Christ was born.

The people who grouse over the correct start date of the new millennium fail to grasp the sentiments of 99.99% of the population: Jan. 1, 2000 was a big deal only because that awkward row of three consecutive nines flipped over to a much neater row of three zeros. *That's* what all the excitement was about—we like turnovers of our "historical odometer." The "old" millennium started with a 1. The "new" millennium starts with a 2. These kind of changes happen once every 1,000 years. And that's kind of special.

Maximum PC also went gaga in March 1999 when the Micron Millennia 500 became the first system to break the minute mark in our old *Photoshop* benchmark. Was the system (so ironically named) that much faster than the Dell Dimension T500, which scored 65 seconds? Of course not! But who can say that passing that 60-second mark wasn't a watershed event?

It Won't Bite, It's Only Pitted Plastic

I'm really upset about this. The plastic of my AOL disc cover happened to have a tear in the corner so that THE DISC WAS TOUCHING MY MAGAZINE! I had to throw the magazine away and buy a new one at the newsstand because of it. I hope you're happy!

—Mike Hough

Other Great Emulation Sites

I really enjoyed your article on emulation in the December *Maximum PC*. You left out several important web sites, though, starting with my homepage. I feel my site is one of the best emulation sites on the Internet. EmulationHQ, or **www.emuhq.com**, has constant news updates and hosts tons of emulators. Some other good resources that you didn't mention are **www.emuforce.com**, **www.emucamp.com**, **www.vintagegaming.com**, and **www.retrogaming.com**.

—Ben

Where Are All Your Spry Athies?

After finishing the December Gear of the Year issue, I have a burning question. The AMD Athlon was named Processor of the Year. But only one of the seven editors listed has an Athlon-based home system. Is there a reason that the P-III is the processor of choice for your editors, despite the Athlon's "Gear of the Year" status?

—Matt Clark

Editor-in-chief Jon Phillips responds: Adept observation, Matt. I'll give you two reasons: 1) Athlon motherboards suffered a slow roll-out. In the early going, system vendors were snapping up all the available Athlon mobos, making it nearly impossible for nuts like *Maximum PC* editors to build their own machines. Read more about this on page 98.

2) *Maximum PC* editors ride the cutting edge, sure, but we're not so radical that we dump our self-customized hot rods the moment faster engines come out. Most *Maximum PC* editors customized their home rigs when the

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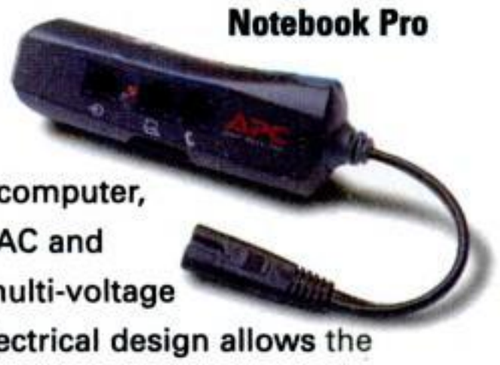

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fastest AMD processor was the K6-III, which, while formidable, was not as attractive a CPU as the Pentium III. I suspect more of us will jump to the Athy when we grow tired of our "slow" 500MHz and 600MHz P-III processors.

Now, Camping Is Just Plain Despicable

I was a little disappointed when you said that most hardcore players consider changing the FOV setting to be cheating ("Master Your Gaming Domain," December 1999). I run *Quake III* tournaments for Teamplay.Net, so what is and isn't cheating is very important to me. Hardcore players *do not* consider FOV changes to be cheating. In fact, I know of very few top players who use the default FOV of 90. Basically, the general rule for cheating is this: If you can change a setting by using a console command (e.g., cg_fov), it is perfectly legal to do so. Cheating occurs when players hack their .pak files to alter the game in ways it was not meant to be altered.

Hardcore players *do not* consider FOV changes to be cheating. In fact, I know of very few top players who use the default FOV of 90.

—Matt Kaufman

Uninstall This!

In December's Commport, you advise one reader to "remember to properly uninstall Diamond's drivers." This type of advice appears all the time, but I have yet to ever see anyone explain just what exactly that means. It's fairly clear how to uninstall a program, but how on earth do you go about uninstalling drivers, and "properly," at that?

—James Killian

Departments editor Sean Downey responds: If you add too many drivers to your system without uninstalling any of them, they'll begin to trip over one another and cause conflicts. Properly uninstalling videocard drivers means using the Add/Remove Control Panel to run the drivers' uninstaller programs. This should remove all the DLLs and VxDs needed to make the card run, as well as the Registry entries and helper apps that are installed with the driver.

Of course, uninstaller programs are something new in the driver world. Previously, uninstalling drivers involved going into Display Properties, switching the display adapter to Standard VGA, then hunting down all the files and Registry entries and deleting them one by one.

Some companies, such as ATI or Matrox, make this process a little easier by including an easily searchable naming convention for every file they install, e.g., starting every file name with "MGA." You shouldn't really worry about the driver files, however, since they shouldn't do any harm (other than clogging up your System directory) if you leave them where they are.

If your drivers don't have an uninstaller, your main concern should be rooting out all entries from the Registry, since these will screw up Windows if left in place. The Diamond Display Property extensions are especially insidious; they can corrupt the Display Control Panel if left in place.

CUT COPY PASTE

The Creative Labs Annihilator Pro reviewed in the December issue was a pre-production version. The retail version doesn't have TV-out or DVI support. The performance of the retail board is the same as the version we reviewed in December.

In the December issue, we also incorrectly reported that Maximum CD Disk Editor Kenn Durrence's DSL speed is 384Mbps. This is simply untrue.

For definitions of Terminator words, hyperlink to the back of Maximum PC.

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New Voodoos Splash Down

Much ado about more than one Voodoo

The 6000 is the big bad voodoo daddy of 3dfx's next generation. It's a 50 to **60 watt board** that **requires an external power supply.**

If a single graphics processor powers the average videocard, is it cheating to pack more than one processor onto a board? 3dfx doesn't think so. The company is building an entire product line around the extra horsepower that two, or even four, chips deliver. 3dfx's new Voodoo Scalable Architecture uses multiple chips in order to reach the fill rates that will secure the company's position as the frame rate king. When they're released in April, the Voodoo4 and Voodoo5 product lines will include videocards ranging from a single-chip 32MB card to a four-chip 128MB behemoth that requires an external power supply.

But, is more than one graphics processor on a videocard really necessary? Yes, in the case of cards like 3dfx's that are powered by the new VSA-100 chip, which isn't powerful enough to stand on its own. The VSA-100 sports a 333 to 367 megapixel per second fill rate at a time when next-generation cards based on nVidia's GeForce are capable of 480 megapixels—and we know that higher fill rates mean faster games. In fact, the VSA-100's single chip fill rates don't stray too far from last year's top-of-the-line Voodoo^3 cards. But, 3dfx has retrofitted the VSA-100's plumbing so that the rendering pipeline will be able to process two pixels per clock cycle, resulting in faster single-textured rendering. And, 3dfx has improved its new processor's multitexturing capabilities, yielding a slight performance boost in games such as *Half-Life* and *Unreal Tournament*.

3dfx's new VSA-100 chip is the first generation of the company's Voodoo Scalable Architecture.

Oddly enough, 3dfx's next-gen cards will be both AGP 4x and PCI parts, but they still won't do AGP texturing. While some criticize 3dfx for lacking the technical prowess to support AGP texturing, the company may be right when it says the feature is dead, since few games today use AGP texturing for storing and queuing up textures in system memory. In any case, the new Voodoos will also support large textures, 32-bit color rendering, a 24-bit z-buffer, and an 8-bit stencil buffer—all features that were available on cards from ATI, Matrox, and nVidia last year.

So, what's truly new in the next generation of Voodoo? Some believe that FXT1 will offer a superior approach to texture compression, which allows game developers to use higher resolution textures without bogging down the rendering pipeline. However, FXT1 will have a difficult time competing with Microsoft's established DXTC compression standard.

For true innovation in next-gen Voodoo cards, look no further than the T-buffer. In addition to enabling such cinematic effects as motion blurs, diffuse shadows and reflections, and focal-point tricks, the T-buffer's full-scene anti-aliasing abilities vastly improve the look of any existing Direct3D, OpenGL, or Glide game. Full-scene anti-aliasing eliminates the

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SPIN CYCLE

This month's top stories broken down ▶

HEADLINE	NEWS	DETAILS	THEIR SPIN	OUR TAKE
Gateway Does Athlon	Backtracking on plans to drop AMD from its lineup, Gateway pitched a surprise PC lineup this Christmas that included AMD's hot Athlon CPU.	Gateway previously said that for "business reasons," it would drop AMD from its lineup, in favor of Intel.	Gateway says it picked Athlon up for "business reasons."	With Intel unable to make enough 733MHz P-IIIs to meet demand, it's no surprise that Gateway opted to sell both 750MHz and 800MHz Athlons.
Bug Pesters Pentium III	Intel's flagship "Coppermine" Pentium IIIs have a bug that sometimes prevents PCs from booting.	The bug forces people to turn their PCs on twice, because the machines fail to boot the first time.	Intel officials say the bug only infected 1 or 2 percent of the new Coppermine P-IIIs, and that new tests will eliminate it.	The bug may have been insignificant, but PC manufacturers Dell and Compaq took it seriously enough to halt sales until a fix was found.

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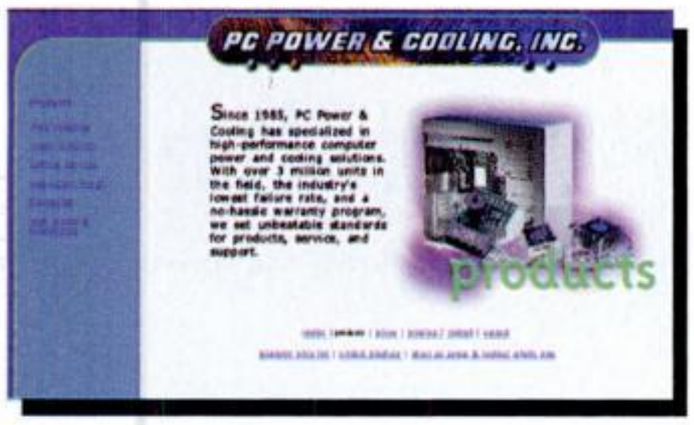

Whether it's step-by-step instructions on how to build your own system, a guide to I/O templates, or deals on our high-performance components—you'll find it at www.pcpowercooling.com.

What's New
Turbo-Cool 425 ATX
PC Power and Cooling is proud to introduce the Turbo-Cool 425 ATX, the first ATX power supply with independent regulation. The performance is awesome! It produces more than 500 watts of peak power, handles brownouts down to 80 VAC, and delivers output voltages that are 10 times more stable than ordinary units. Best of all, even though it's built-like-a-tank and packed with features such as auto-select and complete OCP, the Turbo-Cool 425 ATX is so efficiently engineered that it costs no more than the 400 ATX it replaces! Available Now!
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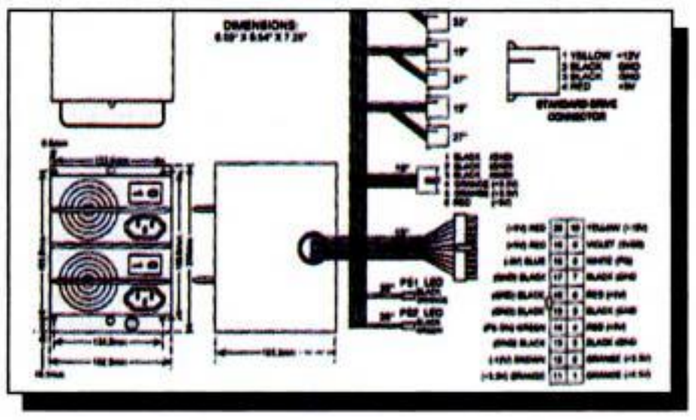

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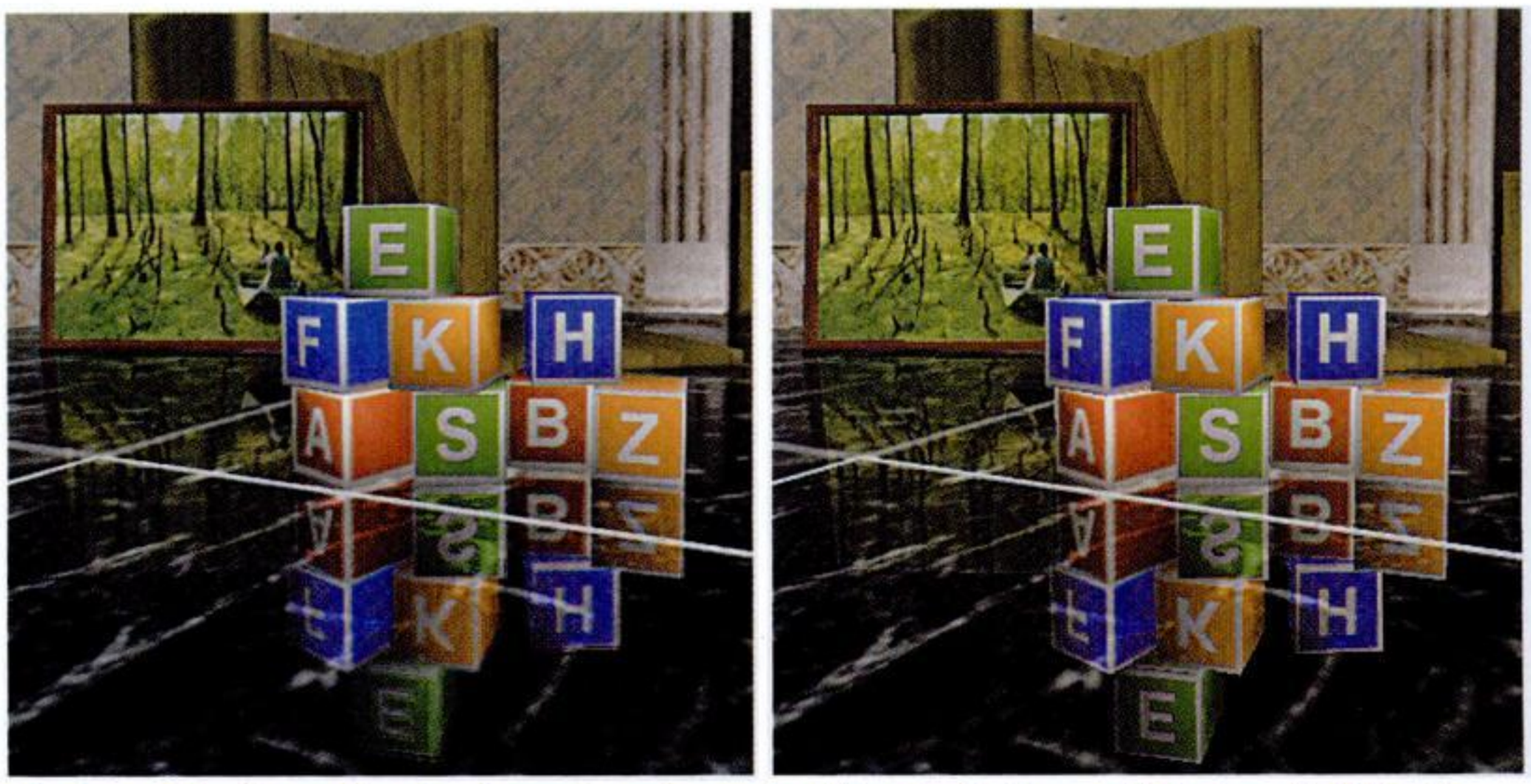
jagged stair-steps, broken pixel lines, and shimmering polygon effects previously visible in every PC game known to man.

The T-buffer works by rendering at least four samples of a scene, manipulating the samples, and combining them for final output to the screen. To render an anti-aliased scene, for instance, four samples are rendered and combined, and the T-buffer shifts each sample down, up, left, or right on a subpixel level, to achieve sharper lines and edges without increasing the display resolution. Since the VSA-100 outputs two samples per chip, the T-buffer needs two or more VSA-100 chips working in parallel on the same videocard if it's to do its thing.



3dfx's new T-buffer enables developers to easily create diffused reflections and shadows that fall off softly, producing the more natural and realistic look seen in the image on the left.

But that's not the only reason 3dfx doubled its VSA-100 pleasure. In programmable scan-line interleave (SLI) mode, the two chips will work in parallel to render alternating lines of a 3D scene. Think of programmable SLI as a more advanced form of the Voodoo^2's dual SLI. Instead of limiting rendering to every other scan line, programmable SLI allows each chip to render entire bands of 1 to 128 lines. Since the load can be dynamically adjusted for each graphics processor, programmable SLI results in more efficient use of each chip. In SLI mode, the quad-chip Voodoo5 6000 can hit obscene fill rates, on the order of 1.33 to 1.47 gigapixels a second.

But what good is all this power without next-generation features? nVidia's and S3's current generations of graphics processors already support hardware transform and lighting—so, why did 3dfx leave this crucial feature out of its upcoming lineup? According to Scott Sellers, Chief Technical Officer at 3dfx, too few titles take advantage of hardware transform and lighting, so "3dfx will have hardware T&L when it matters to the market."

That could be sometime this fall, when it's rumored that 3dfx's next-gen Rampage graphics processors will be available. Already more than a year in development, Rampage is 3dfx's attempt to combine hardware T&L with Voodoo Scalable Architecture, T-buffer effects, and faster memory technologies such as DDR memory. In the ever-evolving videocard scene, will Fall be soon enough? If 3dfx continues to play catch-up with new-feature innovation, probably not.

—Sean Downey

Meet the new Voodoos

Voodoo4 4500
FLAVORS: PCI and AGP
FEATURES: 32MB SDRAM, FXT1 texture compression
FILL RATE: 333 to 367 megapixels/sec
PRICE: $179

Voodoo5 5000
FLAVORS: PCI only
FEATURES: 32MB SDRAM, dual chip programmable SLI, T-buffer, FXT1 texture compression
FILL RATE: 667 to 733 megapixels/sec
PRICE: $229

Voodoo5 5500
FLAVORS: AGP only
FEATURES: 64MB SDRAM, dual chip programmable SLI, T-buffer, FXT1 texture compression
FILL RATE: 667 to 733 megapixels/sec
PRICE: $299

Voodoo5 6000
FLAVORS: AGP only
FEATURES: 128MB SDRAM, quad chip programmable SLI, T-buffer, FXT1 texture compression
FILL RATE: 1.33 to 1.47 gigapixels/sec
PRICE: $599

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HEADLINE	NEWS	DETAILS	THEIR SPIN	OUR TAKE
Feds Spur Spread of Broadband	The FCC has ruled that phone companies must share lines with other Internet service providers.	Companies such as Covad were previously forced to lease lines in order to bring DSL to people's homes. Under the new ruling, they have open access.	Phone companies are crying foul and claiming the ruling imposes another layer of government regulation.	Anything that brings more broadband access to more consumers at a lower price is good.
Computer Viruses Get Smarter	Anti virus experts say there are signs that virus programmers are adding self-updating code to their critters.	One virus, "w95.Babylonia," actually updates four modules through the Internet, and can change its message, payload, and the way it spreads, experts say.	By creating viruses that update their code through the Internet, future viruses could become nearly unstoppable.	Build an OS out of straw and you should expect to have the big bad wolf blow it down.

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MY SON IS A VICTIM OF BAD GRAPHICS.

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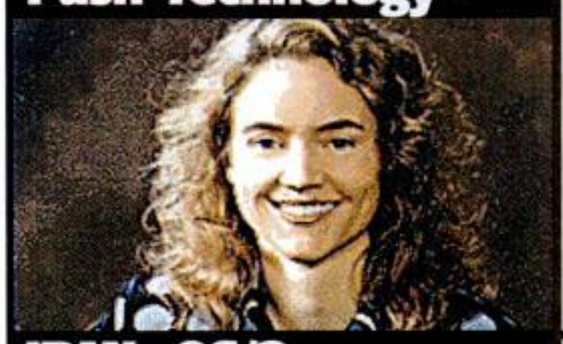
Whatever happened to...?

We're in the middle of the hottest R&D effort in PC history, but for every technology success, two failures get swept under the rug. Recognize the over-hyped projects below? Here's what happened to them.

—Gordon Mah Ung

Technology	Yesterday's Glory	And Today?
Rendition	Back in 1997, Rendition was a major player in the 3D world. Its graphics chipsets powered one of the first filtered, OpenGL versions of *Quake*. The company surfaced again in 1998 with talk of a "Socket X" technology that would let people swap out graphics chips like they swap out CPUs. Rendition also suggested that it would embed memory directly in the graphics chipsets themselves.	Rendition has all but disappeared from the radar, leading many to believe the company is now making replacement balls for Microsoft mice. In reality, Micron Technology purchased Rendition and immediately moved it to its own proverbial Hanger 18. Micron officials tell us that Rendition technology is alive and kicking, and products are expected this year.
VRML	Virtual Reality Markup Language promised 3D worlds and shopping malls that would change the way we communicate and purchase goods. Similar to HTML, VRML is a platform-independent language that describes 3D scenes to web browsers.	No one, it seems, was ever willing to download the huge files it took to create the 3D scenery—which, in comparison to PC games, looked prehistoric. VRML flopped as online versions of *Quake* and *Duke Nukem* exploded, and shoppers made it clear they wanted a clean, text-based interface.
Network Computers	The "NC" promised to shift computing away from Microsoft software and high-powered Intel boxes by using simplified, Java-based, diskless computers to move processing power and data storage back to the server. Oracle and Sun promised that NCs would make computing easier by eliminating Windows.	Oh, the humanity! NC products exploded like the Hindenburg, and all those cute little boxes arrived stillborn. NCs were plagued by performance problems and infighting among the companies that pushed them. Nonetheless, an impending wave of "Information Appliances" that do nothing but browse the web are hyped to be serious competition for the PC.
Push Technology 	Push technology companies, such as PointCast and Marimba (run by Kim Polese, left), were hot items in the final decade of the old millennium. Instead of requesting content by your own volition, you received news and software that was pushed directly to you. In 1997, push technology seemed so promising, even Microsoft built its own push content and channels into Windows 98.	The 90s moved on, and companies discovered that people didn't want to be spoon-fed channels of information. New Internet fads, such as "portals" and "e-commerce," overtook push technology on the pages of *Wired* and other technobabble rags. Unable to finance an IPO, PointCast went on the blocks for sale. Marimba still thrives by selling applications that help businesses update their software through the Internet.
IBM's OS/2	At a time when people were still using lame old 16-bit Windows 3.1, OS/2's ability to address large hard drives and tons of RAM—as well as being fully-multithreaded and multi-tasking—made it seem that a new era of computing had arrived.	Microsoft, a co-creator of OS/2, peed on IBM's parade by introducing Windows 95. Though Win95 lacked many of OS/2's sexier features, Microsoft had developer support. With a serious lack of 32-bit application support for its fledgling OS, IBM pulled in its horns and even began loading Windows 95 on its own PCs. OS/2 continues to be popular in financial markets, but is no longer a real contender.
Bushnell and Atari	Considered the father of the video game, Nolan Bushnell created *Pong* and the Atari 2600 gaming console, and had a chance to run Apple when it was still relevant.	Bushnell took Atari to its heights in the 1970s, before selling the company off for millions and disappearing à la Bobby Fischer. Bushnell went underground for more than 20 years before resurfacing in the mid-1990s as an exec at PlayNet, which sold interactive handheld computers. When PlayNet folded, Bushnell again faded from the headlines. He emerged again in 1998 to play a game of *Pong* against world champion Thresh at the E3 gaming expo. Now, that's important stuff.
Fahrenheit	After a mid-1990s cease-fire in their battle for control of 3D APIs, both Microsoft and SGI agreed to jointly develop Fahrenheit. Fahrenheit was slated to combine the best elements of OpenGL and DirectX, resulting in a super 3D API that would satisfy the needs of all 3D programmers.	The deal ended in a bloody divorce. As it struggles just to see another day, SGI has abandoned all support for Fahrenheit. Microsoft, however, insists that a combined version of DirectX and OpenGL is still on track, and that a beta will be out by the end of this year. More cynical observers doubt Fahrenheit will ever be introduced, and that if it is, it will certainly only benefit Microsoft.

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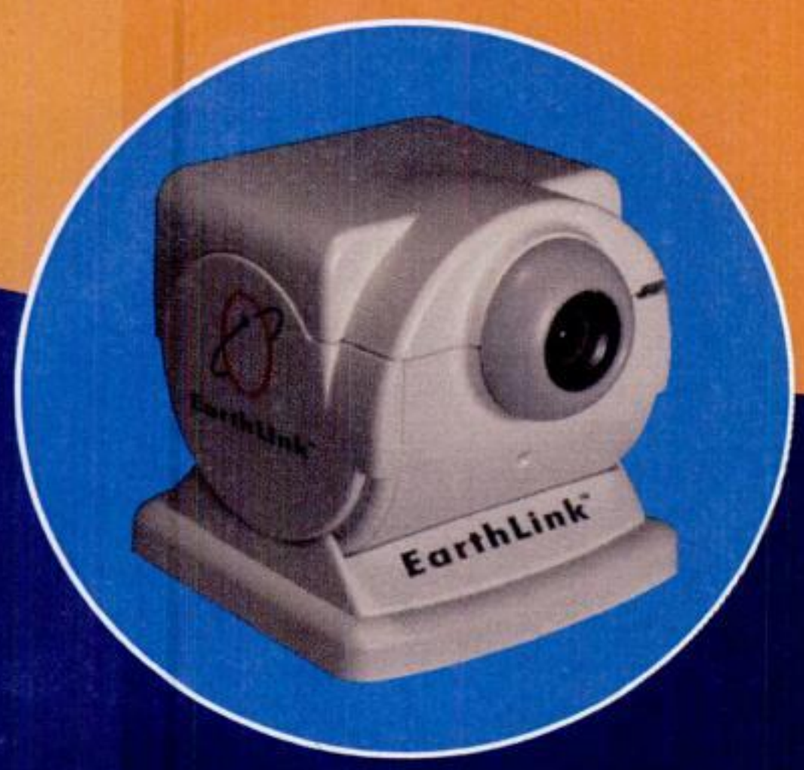

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ILLUSTRATION BY SCOTT LAUMANN

▶ Maximum PC takes a bite out of bad service and gear

WATCHDOG

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing Watchdog @maximumpc.com. The Dog promises to get to as many letters as possible, but only has four paws to work with.

DEAR DOG I ordered an Endeavor EX system from Crossline on August 17. I did not receive the system until September 24, even though my credit card was charged the same day I ordered the system.

When it finally arrived, the box with the monitor had an old shipping invoice in it, and the montior was obviously used. The machine wouldn't boot, there was no Windows CD, and the AGP card was loose. I called and asked for an RMA to return the system for a full refund under Crossline's 30-day money back guarantee. They grudgingly gave me one and I returned the system on September 27 via UPS.

I have proof the machine was received on October 1. But now, I cannot reach Crossline via phone, fax, or e-mail to find out where my refund is. The Better Business Bureau says its mail to Crossline was returned, but the phone company says the company is still there. I assumed since Crossline took out a two-page ad in your magazine in November that the company was still thriving, but you never know. It's been over a month now with no contact.

Could you help me find out if this company is still kicking? I just want my refund; that's a heck of a lot of money for a student, you know!

—Jennifer Hadley

Count *Maximum PC* as another victim of Crossline's shenanigans, Jennifer. In addition to taking orders for PCs it never sent, and failing to provide refunds, Crossline 2000 took out two-page spreads in the October and November issues of *Maximum PC*. It's unclear whether Crossline officials knew the company was going belly up when they signed a contract for one year of ads—but they failed to pay for the ads.

Don't be fooled by its appearance in *Maximum PC*. Crossline 2000, a.k.a. Crossline Commercial, a.k.a. Crossline Computer is out of business. Its offices are vacant, its phone lines are disconnected, and its web site has gone 404.

The Better Business Bureau says it received more than 100 complaints about Crossline. A majority of those are considered closed because Crossline never responded to them. But, there may be some payback coming, since the disappearing act attracted the attention of law enforcement.

"It's a bust out," Los Angeles County Sheriff's Detective Joe Pena tells THE DOG. The Sheriff's Office has an active investigation open on Crossline, Pena says. Although there were complaints by individuals, most of the victims appear to be Crossline's suppliers. In all, Pena estimates the losses may hit $1 million.

Crossline appears to have fulfilled orders for seven months before getting freaky in August. Checks of public records databases show several lawsuits filed by suppliers against the company. Calls to the owner's home in Anaheim, CA, turned up a disconnected line.

Was there a crime committed? That's to be determined, Pena says. "If you can prove the intent of the person for continuing to operate was to steal from people, then it's a crime," he says.

As part of his investigation, Pena is soliciting statements from people who were burned by the company. Write a short statement about your situation with Crossline and include copies of your money order, check, or credit card bill showing a charge by Crossline. Be sure to include your full name, address, date of birth, and contact information. Send the package to Los Angeles County Sheriff, Forgery Fraud Detail, attn: Detective Joe Pena, 11515 Colima Road, M104, Whittier, CA, 90604.

There are rumors that Crossline planned to file for bankruptcy, but The Dog's digging on Federal Court computers turned up nothing by press time. Watch this space for updates on the Crossline 2000 situation.

"Once customers asked for a refund, they were given the runaround."

MICROWORKZ SUED; OUT OF BUSINESS?

As detailed here last month, the Washington State Attorney General followed through on threats to sue PC maker Microworkz. The AG sued Microworkz for allegedly "failing to deliver equipment, honor warranties, issue refunds and respond to consumer inquiries and complaints." Washington state Attorney General Christine Gregoire says. Microworkz continued to sell PCs even though it couldn't keep up with the demand it already had. Some 95 people complained to the AG by the time she decided to lower the boom.

"Once consumers asked for a refund they were given the run-around," Gregoire says. "Consumers were told the check was being 'processed' or would be issued in a specified

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number of days. Even when consumers did get refund checks, some were returned for lack of sufficient funds." The AG is asking for an injunction to stop Microworkz from selling PCs it can't supply, as well as restitution and court costs.

Readers have harped about customer service from Microworkz for months. Last month, Microworkz executives told **THE DOG** that the company had given up on directly selling PCs because it couldn't handle the demand. "We cop to the fact that we made big mistakes," said Lance Rosen, the company's Chief Operating Officer.

"These errors can be the difference between life and death."

At press time, the situation at Microworkz appeared to have worsened. The Seattle company's phone numbers were constantly busy and its web site no longer showed contact information, products, or services. Technology news site News.com also quoted sources as saying the company had ceased operations. The Dog managed to reach Lance Rosen on his cellular phone but he declined to comment on the status of the company because he was "no longer employed there." Rosen was hired just three months before to help bring a steady hand to the company.

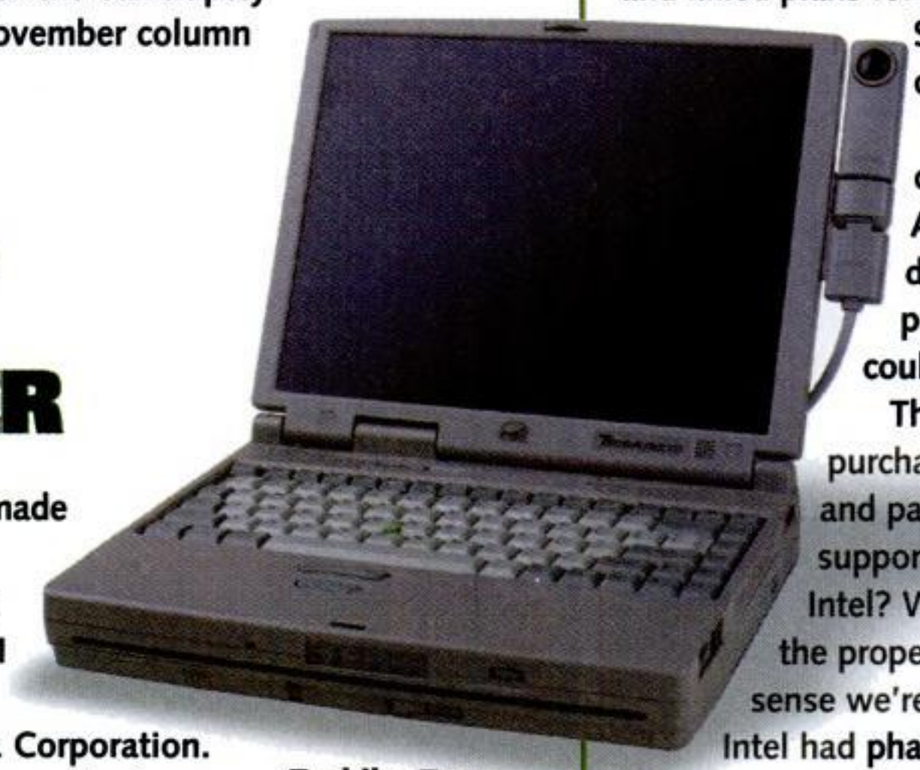
Even if the company has closed its doors, state officials say they'll press forward with the suit. "Even if they have shut down, that doesn't prevent the fact that they haven't reimbursed consumers," said Paula Selis, senior counsel for the consumer protection division of the Attorney General's Office. Stay tuned for more info.

UPDATE: GUILLEMOT EATS HERCULES

There's good news and bad news for owners of Hercules products. PC component maker Guillemot has purchased the company, with plans to sell graphics cards under the famous Hercules name. Hercules fell into the abyss in August when the company filed for bankruptcy. Guillemot may offer some support for older Hercules parts, but had not made an official decision at press time. People who are owed refunds or parts by Hercules are out of luck; as part of the buyout, Guillemot has not assumed any of Hercules' liability. Those who still have claims should file with the bankruptcy court. See **THE DOG**'s November column for details on filing.

TOSHIBA FLOPPY DISORDER

Own a Toshiba notebook made between 1985 and November 1999? You may qualify for a piece of a $2.1 billion dollar settlement signed last fall by Toshiba Corporation. The company was sued by notebook owners after it was discovered a floppy controller used in the bulk of Toshiba notebooks could corrupt data under certain circumstances.



Toshiba Tecra 780 DVD

Toshiba officials say the company settled the suit to help ensure customer confidence in its notebooks and is "not aware of any instance in which one of our computer owners has experienced data loss or data corruption under the circumstances in the lawsuit."

Although the settlement makes the company look guilty of knowingly using defective components in its computers, Toshiba officials note that not even those who originally filed the suit suffered any known data loss. Attorneys for the plaintiffs say that's not the point.

i740 no more

"If you're talking about word processing applications, it's a nuisance. If you're using data in medical, scientific, or complicated statistical analysis, these errors can be the difference between life and death," says Beaumont, TX, attorney Wayne Reaud. "Faulty disk controllers are a real problem and they cause real damage..." Other PC manufacturers who used the same defective floppy controller will be the target of similar suits, Reaud says.

The settlement on certain Toshiba notebooks may be as high as several hundred dollars. Monies not claimed by people in the class will be used to purchase Toshiba computer equipment that will be donated to schools. Visit **www.fdc-class-settlement.com** for full details of the settlement, or call 888.353.8138 to see if your notebook is affected.

UNREAL 3D?

THE DOG normally steers clear of rumors, but couldn't help sniffing at this one. Real3D, the company that helped build Intel's popular i740 chipset, is a goner. Intel was a major investor in Real3D and many expected the duo to rock the graphics world. That prediction turned to dust after products from nVidia, 3dfx, and Matrox blew past the i740 at warp speed. Intel soon lost interest in the graphics board game and killed plans for a sequel that was to be called the i754. Suffering from lack of product, Real3D canned most of its employees.

ATI insiders told The Dog that a gaggle of former Real3D employees now fly the ATI flag. Calls to Real3D turned up mostly disconnected phone numbers, and the one person we were able to reach said she couldn't comment on Real3D's plans.

There may be hope for Real3D; Intel has purchased the company's technology portfolio and patents. It's doubtful any further driver support will come from Real3D, but what about Intel? While Intel officials said there's no plan for the property, their spokesman said that, "If it makes sense we're going to [provide support]." However, Intel had phased out phone support and apparently planned to kill all support for Real3D until users cried foul.

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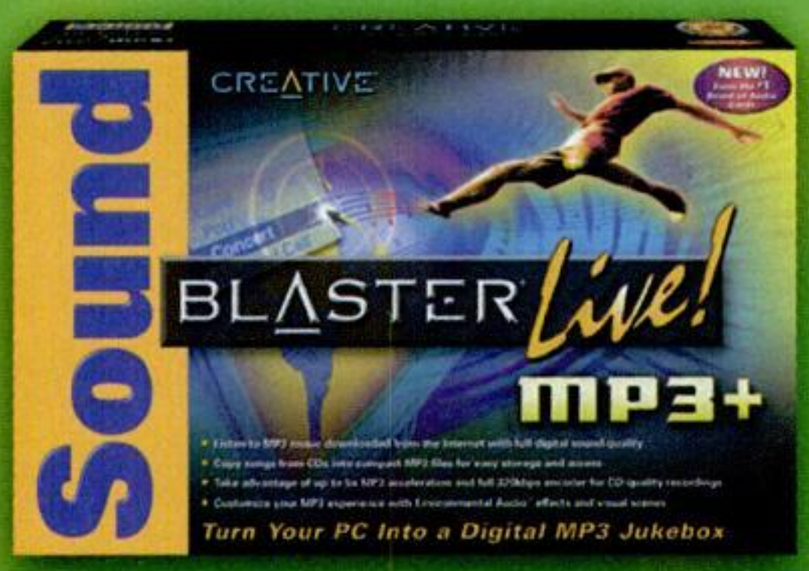

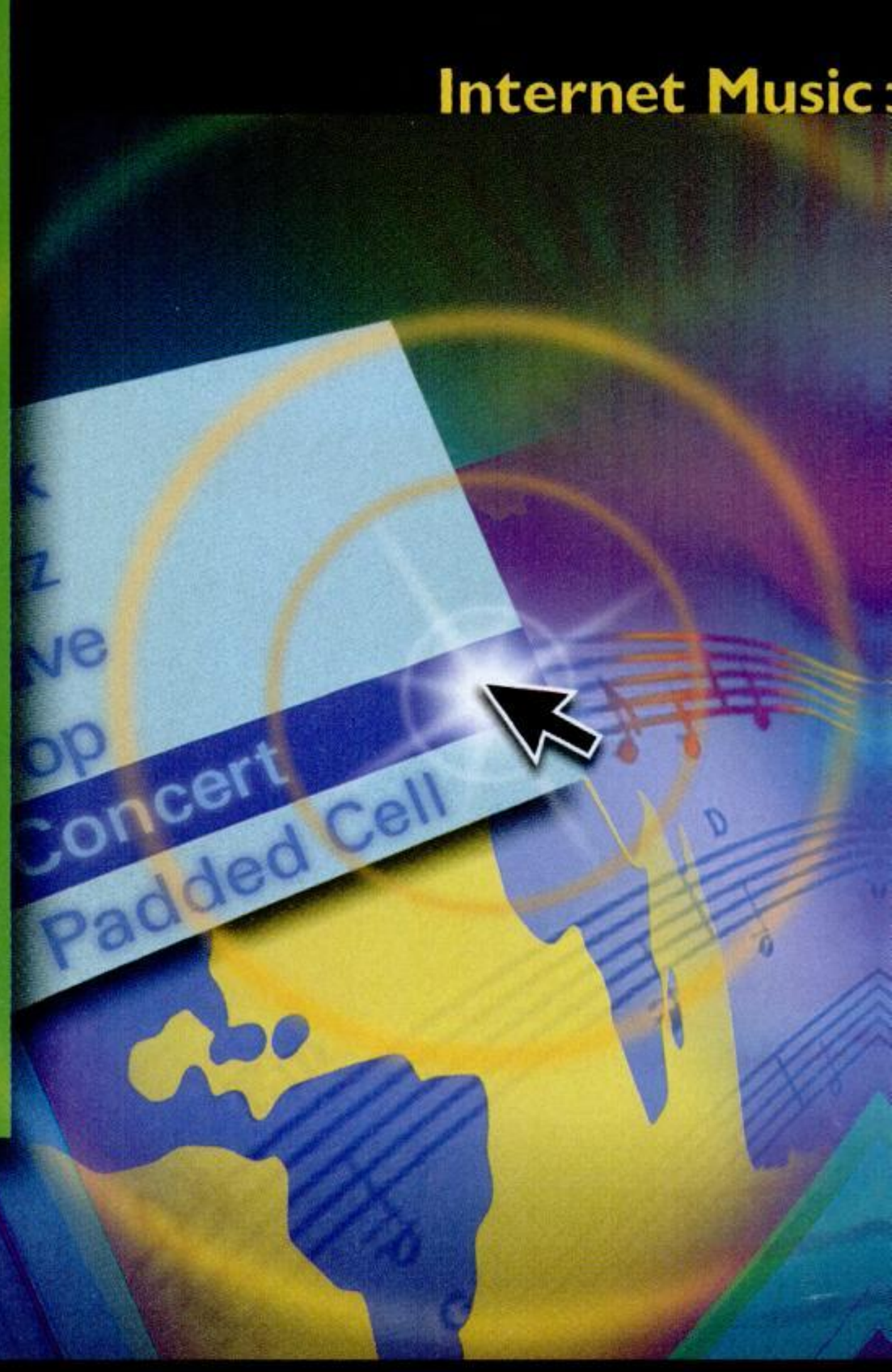

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$6999; InFocus; www.infocus.com; 800.294.6400

USB PC Radio

From the category of "truly plug-n-play" comes D-Link's USB PC Radio. Consisting of a receiver and an antenna that plugs into your PC's USB port and soundcard's line-in, the PC Radio pipes local FM radio stations right through your computer. For those of you who miss the 1982-esque magic of recording songs off the radio—in all the poor fidelity that radio offers—the PC Radio can capture any broadcast as a WAV file and convert it to MP3. You may ask yourself why the hell you would want to do this, since you certainly aren't going to get CD-quality audio from a radio receiver piped through your soundcard. Beyond the fact that PCs make everything better, we can't answer that. We can, however, say that the PC Radio's simplistic software is pretty damn easy to use, possibly because such features as Channel Presets, Tune, and Scan are staples of most radios—and at the end of the day, the PC Radio is just a radio. OK, it offers Sleep and Wake options as well, so it's also a clock radio.
$30; D-Link; www.dlink.com; 949.788.0805

CamPrint

If synching your digital camera with your computer is giving you waxy buildup, you should check out Syntran's CamPrint. This handy household helper cuts out the PC middleman by printing pictures directly from your camera to your color printer. The lemony fresh CamPrint offers a variety of printing options, such as printing duplicates or mirror images, or printing up to 21 different pictures on one sheet of paper. It'll also put some polish on your prints with auto color calibration that tunes individual printer properties for the highest quality images. The CamPrint also includes an autoswitch that lets your PC share the printer when it needs to. It's incredibly easy to use; just plug it in and print.

Use CamPrint only as directed, though, because it's not compatible with all cameras or printers (Syntran's web site contains a list of favored hardware).
$130; Syntran; www.syntran.com; 650.967.8980

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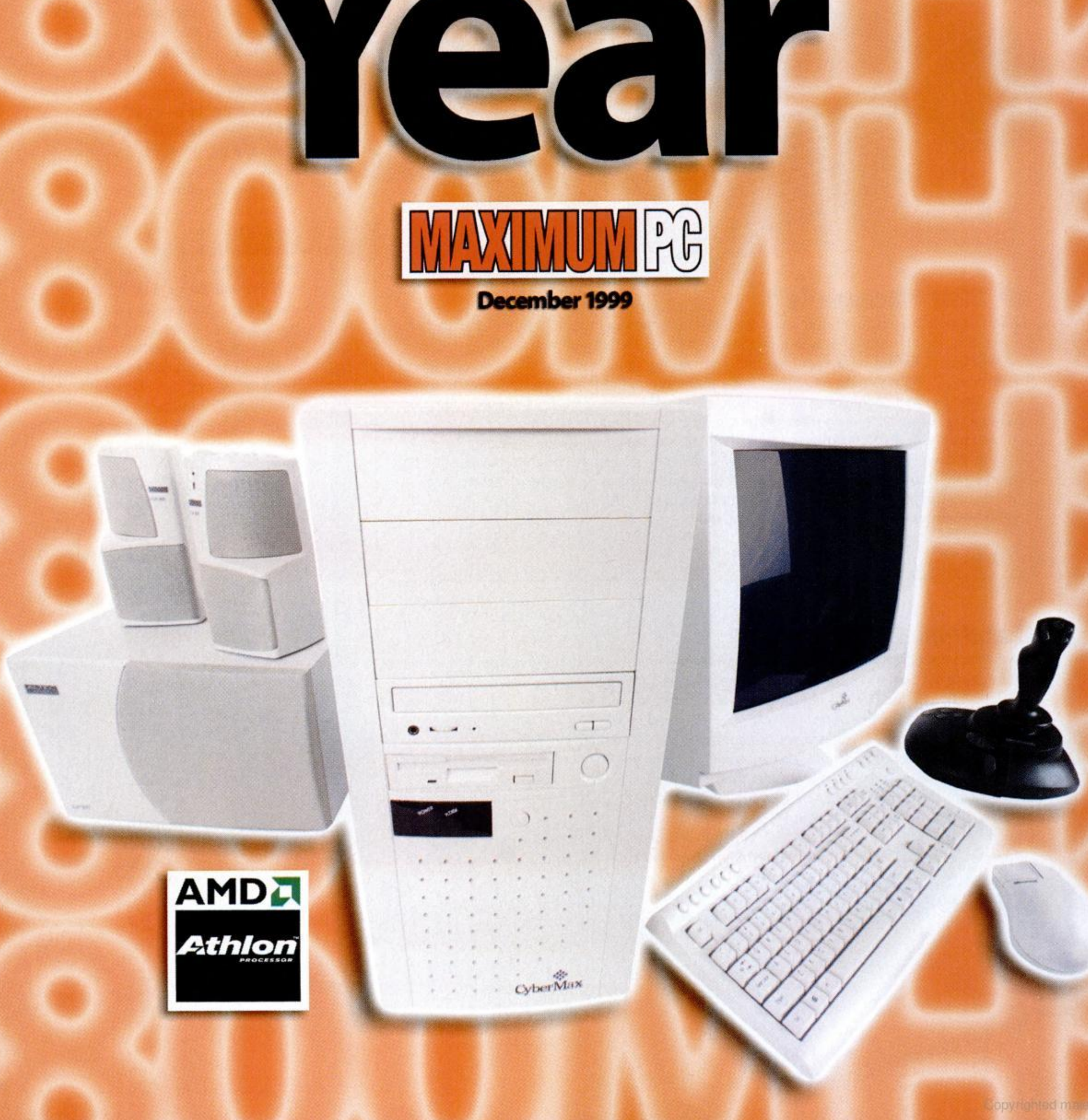

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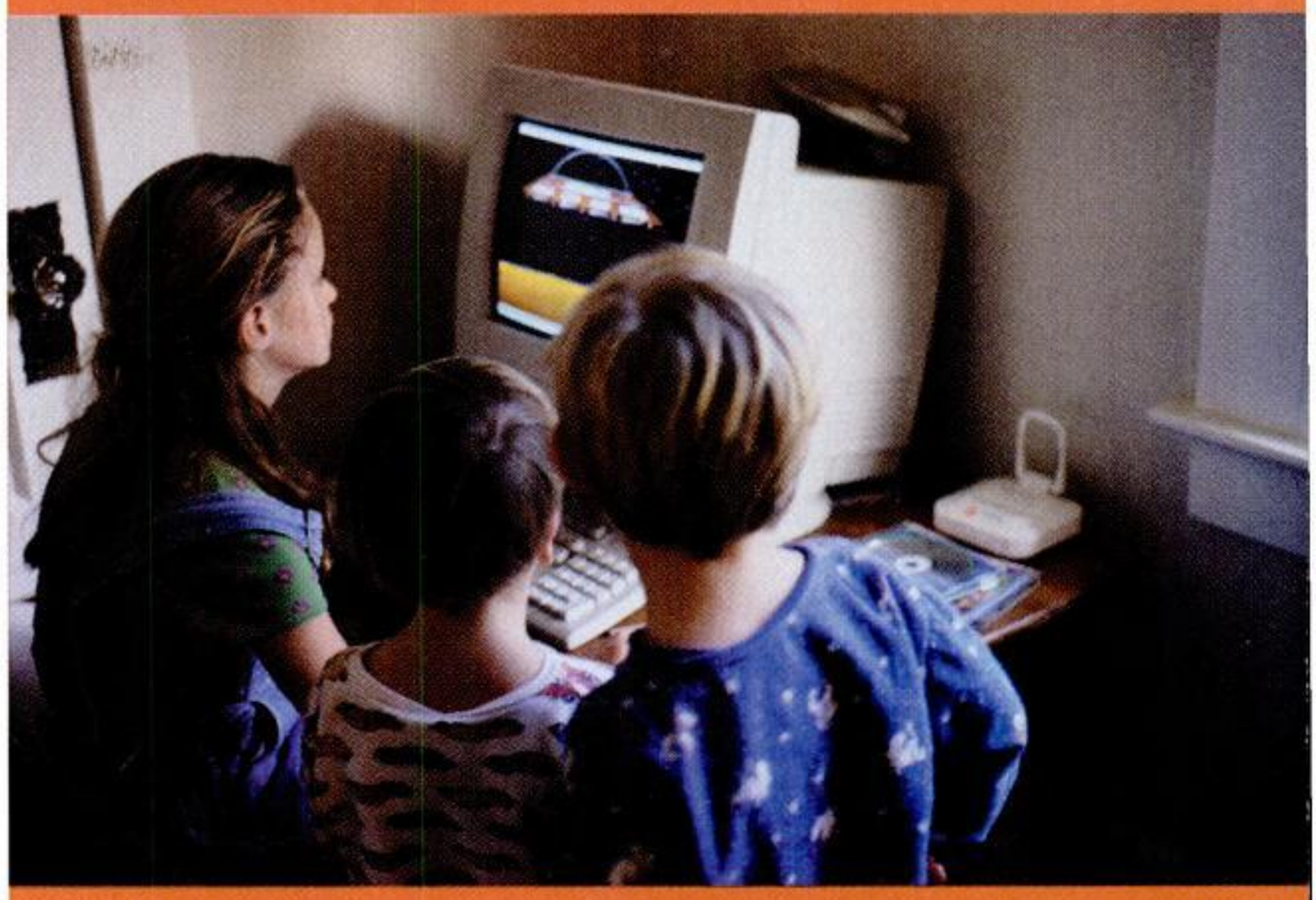

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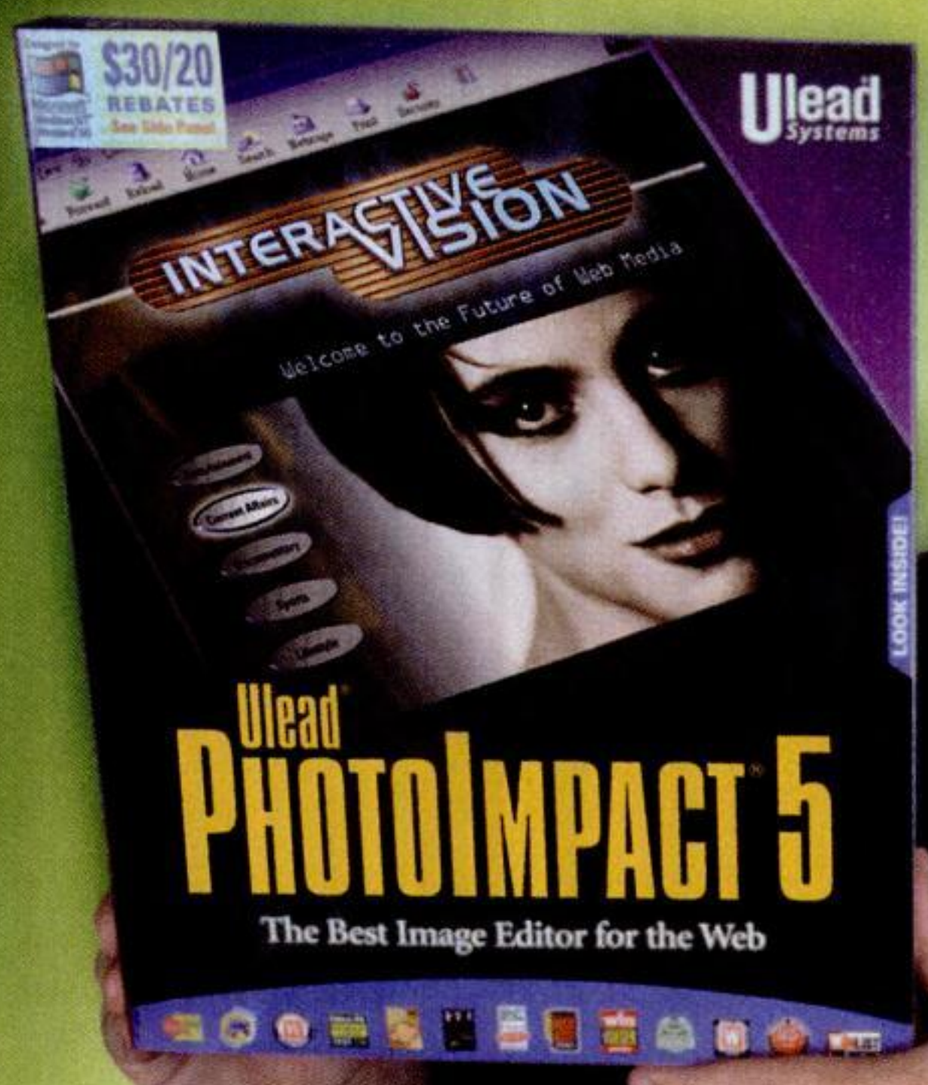

I finally found it. After struggling with other image editors that made designing Web graphics a long and tedious process, I found one that makes it an easy, painless experience. And unlike those other programs, PhotoImpact was the first image editor designed specifically for the Web. It lets me:

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▶TOMORROW'S TECHNOLOGIES EXPLAINED

FAST FORWARD

Trading Your Data for Dollars

HOW TO TURN YOUR PERSONAL HABITS INTO COLD, HARD CASH

Would you like to get your next computer for free? It might be easier than you think. And no, I'm not talking about those deals that require you to sign up for five years of Internet access with SlowNet.com at $25 a month. That's one way to get a free machine, but an alternative is to barter little pieces of information about your life. I'm talking about trading data for dollars.

You're probably already doing this, whether you realize it or not. If you save a few dollars by purchasing a disk drive on a discount merchant's web site, in effect you're selling your e-mail address, your postal address, your credit card number, and perhaps some additional information, in exchange for saving those few dollars. The merchant will add your e-mail and postal addresses to his database and probably send you advertising about future deals on similar products. He might even sell your contact information to other merchants, who will also send you junk mail. You could avoid that by anonymously purchasing the disk drive with cash at a local store, but some people would rather pay the lower price. They are trading data for dollars. In the Information Age, information is a commodity that can be bought and sold.

That's not a bad thing, as long as you understand that the transaction is taking place. It's not OK when you don't realize that private information about you is being collected, or when you're unaware of how some potentially damaging information might be used against you. But sometimes, trading data for dollars can get you a good deal.

For instance, I have a discount card from my local grocery store. When the cashier rings up my purchases, my card entitles me to savings that other people don't get. I didn't have to pay for my card. All I did was give the company my name, postal address, and phone number. Oh, I gave them something else, too: data about my weekly shopping habits. The company's computers can now keep track of everything I buy. The cash register even prints out customized coupons just for me.

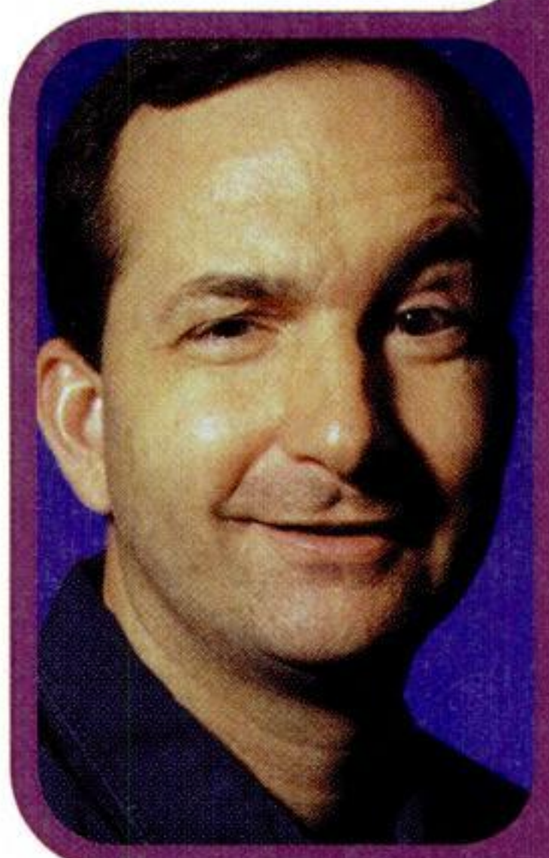
In the Information Age, information is a commodity that can be bought and sold.

In effect, I sold some personal privacy for about $10 a week in discounts, which adds up to about $500 a year. That pays for my home computer, because I usually spend about $1,500 on a new computer every three years. To me, that's a good deal, because I don't care if a COBOL programmer at a corporate data center in New York knows what kind of juice I drink for breakfast. If you want a free computer every few years, you can probably strike a similar deal with a local merchant or an online business—or you can choose not to. That's how it should be.

Ironically, some of the information the grocery store gathers about my shopping habits is bad data. Sometimes, I'll buy a different brand of toothpaste or some other product because the discount card gives me a bigger discount on that brand. In other words, the card influences my shopping habits, so the grocery store collects distorted data about what brands I *really* prefer. Too bad.

Some personal information is worth protecting, especially when you're online, so it's good to follow a few simple rules. Don't fill out questionnaires online unless you absolutely trust the people behind the web site, and they've posted a privacy policy you can live with. Don't enter critical information online, such as credit card numbers, unless the trusted web site uses a secure HTTP connection (look for the "locked" icon on the status bar of your browser). Don't provide information that the other party doesn't really need, such as a Social Security number when you're buying a disk drive. Don't write anything in an unencrypted e-mail message that you wouldn't write on a postcard.

But don't get *too* paranoid, either. Some of your data really is worth cash. It's amazing how much some companies will pay for information that everyone would know if you lived in a small town where everybody gossiped about you anyway. ✹



TOM HALFHILL
is senior editor at MDR's *Microprocessor Report*, and is regarded as one of the most knowledgeable processor technology experts in the industry. Contact him at **thalfhill@maximumpc.com.**

Random Thoughts

▶ You might be wondering why Taiwan-based VIA Technologies bought Centaur months after acquiring Cyrix, another vendor of x86 processors. The reason is technology: Centaur's next-gen WinChip appears to be much more efficient than Cyrix's next-gen Jalapeno core. The new WinChip has only half as many transistors and will probably run at higher clock speeds, so it should cost less and be easier to cool, too. VIA's plans were shaken up by the recent Taiwan earthquake, so we'll have to wait a little longer to see exactly how VIA challenges Intel.

▶ CD-RW drives are wildly popular, but not everyone has a spare expansion bay for a second CD drive. Solution: Replace a CD-ROM drive with a CD-RW. CD-RW drives can't read as fast as the latest CD-ROM drives, but only the most demanding users will see a difference between a 32x CD-RW and a faster CD-ROM. You don't need two CD drives to copy discs; CD-RW software can do single-drive copies by temporarily storing data on your hard drive.

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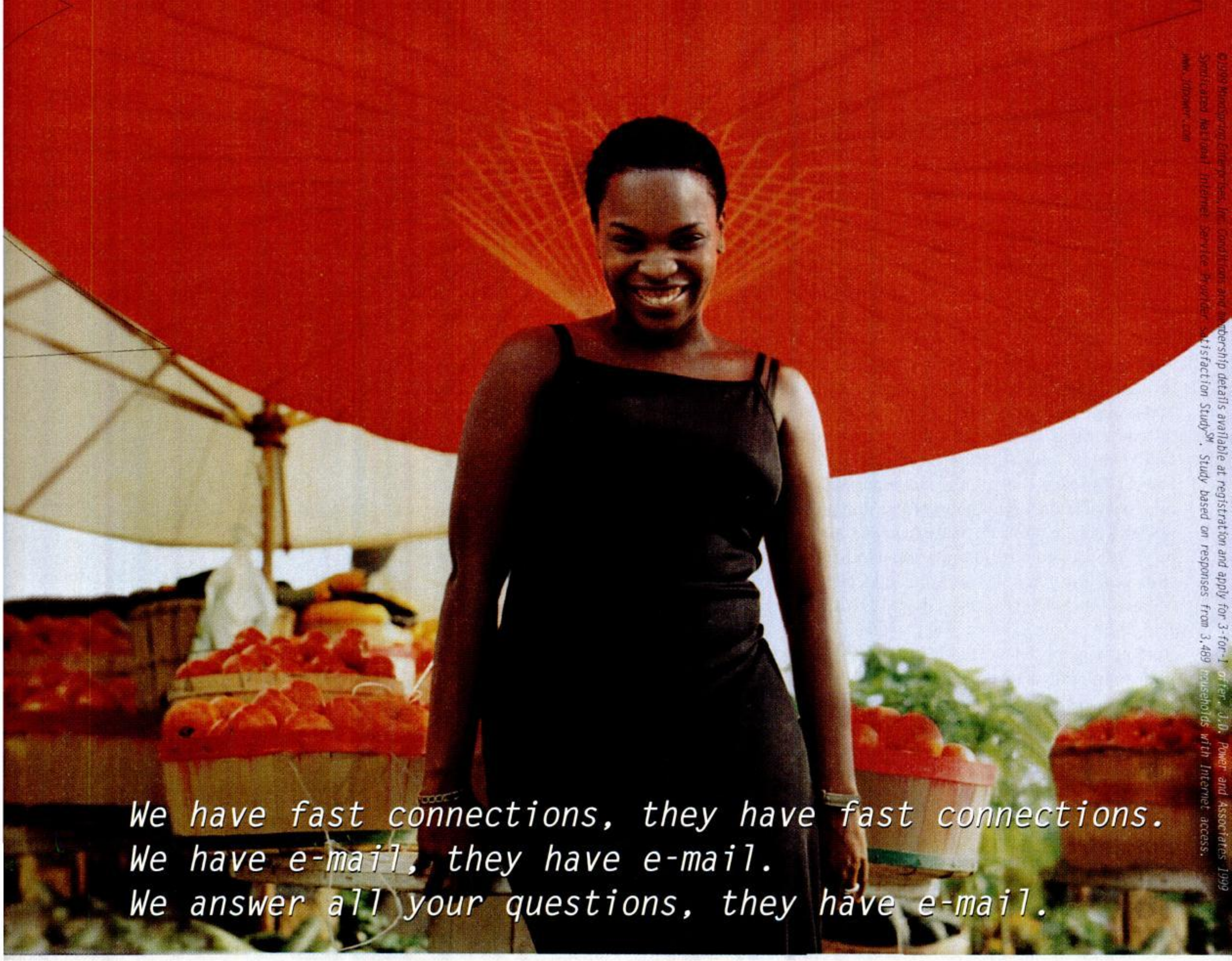
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▶ GETTING MORE FROM YOUR TIME ONLINE

NET SENSEI

Entertaining 101

HOW REGULAR GUYS CAN LEARN TO PARTY ONLINE

Do you hate planning get-togethers? Ever call up a dozen buddies for an outing to the movies, but somehow end up eating a large popcorn all by your lonesome? Bored with parties at which the entertainment involves staring at the walls and seeing who'll pass out first? Oh, and my favorite blunder ever: Did you ever throw a party at which the guest of honor didn't show, then later told you that she (ahem) "forgot."?

If you answered yes to any of the above—or if you're (ahem) Irene—you may need a bit of help organizing your free-time fun. Even if it's just to get people over for beer and Monday Night Football, the following web sites will help you to organize a memorable time.

Getting Ideas

Party411 (**www.party411.com**) By far, Party411 offers the best online help for the completely clueless host. Free party planning ideas and themes for everything from weddings to corporate events—my fave was Rock 'n Roll Bar Mitzvah—make this an invaluable site. Also, check out the advice columns on etiquette, party ideas, games, and stress associated with parties (from Dr. Sonya Friedman). Take the time to try out tools such as a budget planner, guest list planner, and drink calculator, as well as links to professional party planners and suppliers, and before you know it, you'll have yourself a ball.

Commitment (**www.commitment.com/feast.html**) I admit it's an online woman's magazine, but keep an open mind—it's chock full of great ideas. Like throwing your party at a hotel, so your guests can use the Jacuzzi or swimming pool, and no one has to clean up the next day. Or "children's" games such as Mummy, in which you take the toilet paper from the aforementioned hotel and wrap your best friend in it from head to toe as quickly as possible. Besides being Picasso-level creative, the unusual ideas on this site (which isn't trying to sell you anything) can be executed on a starving-artist budget.

Perfect Drinks

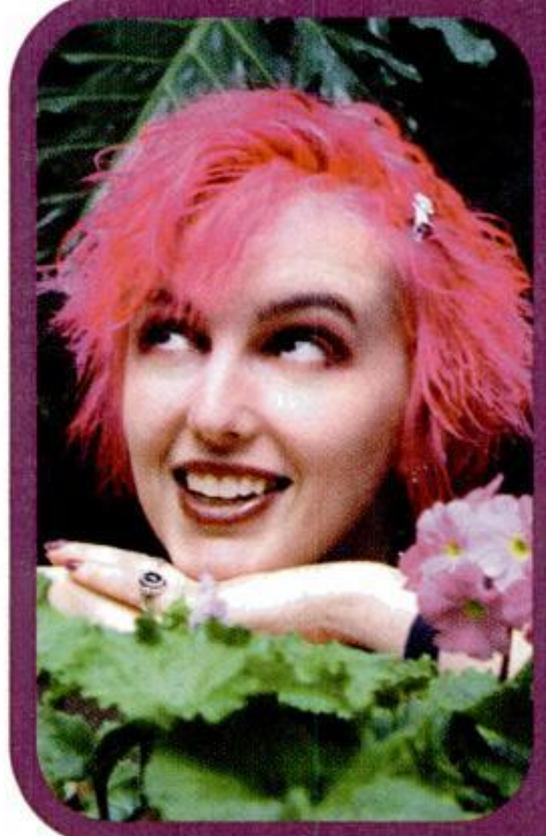
iDrink (www.idrink.com) Whether you like your poison on the rocks or straight up, you'll probably find what you're looking for at iDrink. The massive database contains more than 5,000 drink recipes, which makes it run a bit slow, but it's worth the time. Enter in a list of ingredients you have on hand, and you'll get recipes for both alcoholic and non-alcoholic concoctions that you can create from them.

Remember: The best way to get invited to a party is to throw one.

Cocktail (**www.hotwired.com/cocktail**) It changes its beverage of focus only once a week, but you're gonna learn more about fixing that cocktail than you ever thought possible, such as the etymology of "slipped him a Mickey." This awesome web site includes a drink "blender" that considers the size and mood of your party and suggests appropriate cocktails to serve.

Gathering the Gang

eVite (evite.com) In addition to offering lots of great party suggestions (including excuses to throw a party when there isn't a holiday), eVite helps you to easily create invitations and track RSVPs. All you need are the event details and a list of e-mail addresses; eVite automatically creates an invitation page for you, complete with maps, directions, and weather reports for the location and day of your event. Then it sends the page's URL to everyone on your e-mail list. A message board and list of invited persons is visible to you (or to everyone on the list, if you choose), with organized lists of who's coming, who's not, and who hasn't decided. You can send e-mails to an individual or to a group of people, such as a reminder to all of the undecideds. It also allows you to upload photos after the event, so incriminating evidence can be shared with all.



SHERRY MONARKO has used the Internet for everything from ordering pizza to getting married. She is Lead Online Designer for Imagine Media's Computers & Technology Division. Contact her at **smonarko@maximumpc.com.**

Mambo (**www.mambo.com**) Similar in functionality to eVite, Mambo helps you create an invitation, but offers more for those who want something more traditional-looking. The colorful page that Mambo creates can be easily printed for mailing or handing out to offline friends. Party advice is currently limited to suggestions for the San Francisco area, but the free service can be used by the world. For those who hate waiting for multiple web forms, try "express Mambo." Just pop in the event details, e-mail the list right into the homepage's form fields, and get ready to rock.

These web sites should help you to get your soiree off the ground, but the rest is up to you. Gather your friends into your favorite chatroom if they won't leave the house. Just remember: The best way to get invited to a party is to throw one. ✹

Random Thoughts

Trends I hate:

▶ Naming a web site by taking a noun and slapping either an "i" or an "e" in front of it.

▶ Animations with very little movement that cycle faster than the tunes at a rave.

▶ Sites that won't let you have any information (including exactly what's on the site) without "registering." A conspiracy, perhaps?

Coolest web site concept I saw all month:

▶ Xpertsite (**www.xpertsite.com**)

Get this—real people ask questions and real people answer them. Not a staff of people, but a large online community of willing volunteers on various subjects. You can sign up to be an "expert" on a subject.

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One Chip Can Turn One Second Of Gaming Into

ONE HELLISH NIGHTMARE!

Today's game opponents are tougher to beat. So we're issuing you an unrivaled weapon. The new Viper II graphics card is equipped with 4X AGP power and a transformation and lighting engine for the most realistic images ever. Better yet, Viper II now features S3TC texture compression, which hurls up to 15 million triangles at your monitor every second for the most intense 3D action ever. Make your screen image come alive. Unless, of course, you'd prefer to make them otherwise.

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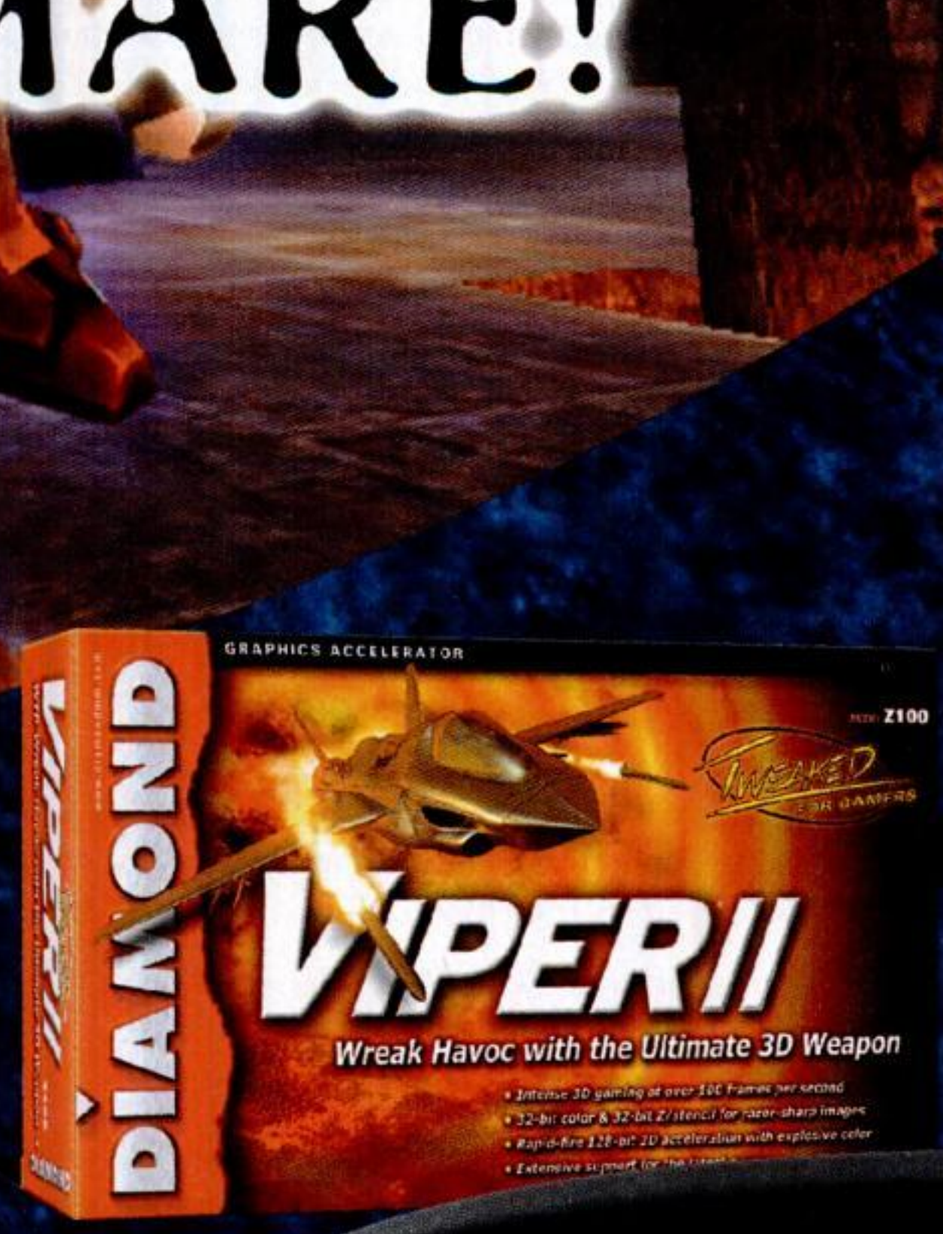

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▶THE SCOOP FROM A MAJOR PLAYER

GAME THEORY

Since the holiday titans of gaming hype have hit shelves, I thought I'd take a second look at the picks I made in December's "Maximum Hype" feature, and see just how they all turned out.

The big news, of course, was *Diablo II*. As the December issue was going to press, I spoke to Susan Wooley of Blizzard and asked three separate times if the game was shipping for the holidays. I figured that by the third time, I'd get the right answer. I didn't figure quite right. At the time, Susan felt in all honesty that *Diablo II* would make its ship date. But a few weeks later, she sent the following e-mail to the press:

"After discussing the time needed to fully play-balance, polish, beta test, and debug the game, we feel that it is important to let the gaming community know that we do not expect to release *Diablo II* before the end of the year."

The explanation wasn't a dodge, but a confirmation of what we already knew about Blizzard: For them, release dates mean nothing if the product is not done. In that respect, Blizzard stands alone among developers; it holds onto its games well through the beta stage in order to ensure that the boxed product is not only stable, but also meticulously play-balanced. By the end of the year, a *Diablo II* beta test was rolling out to 1,000 gamers, followed by an open beta designed to, as Blizzard explained, "stress-test the new Battle.net servers. We have redesigned the Battle.net architecture using a client-server network, to prevent cheating and to expand the multiplayer component."

Few publishers would have sacrificed huge holiday sales for continued beta testing. (For that matter, few publishers truly beta test any more. Why should they? *You're* paying for the privilege of doing it for them.) But, as Susan explained, "We have worked hard for many years building this trust, and, as we have promised before, will not take development shortcuts at the expense of disappointing our customers." The only other developers who could make a similar claim with a straight face are id and Firaxis. Release dates be damned!

Few publishers would have sacrificed huge holiday sales for continued beta testing.

The gamers who are bitching about the *Diablo II* delays are the same who bitch about bugs and server problems. You don't need another game right now. Read a book, spend time with your families, hold onto your jockeys, and wait till it's done.

In other news, *Daikatana*'s release-date shuffle wasn't nearly so noble or unexpected. Since I reported that the game would ship in November "ready or not" (more likely not), it came as no great surprise when I learned it was pushed back to mid-December. I've still not had a chance to play the final game, so I can't tell you whether it runs or limps, but by the time you read this, the verdict should be in.

I have, however, had the opportunity to spend time with a few other games about which I had serious doubts. *Indiana Jones and the Infernal Machine* confirmed my worst fears (and then some) about the move to third-person 3D. The game isn't bad at all—it's just crushingly banal. *Indiana Jones and the Fate of Atlantis* was clever, funny, interesting, charming, and challenging. *Infernal Machine* is none of those things. When Indy moved a block within the first five minutes of gameplay, I was ready to plotz. This needn't have happened; there is still a market for the graphic adventure, as LucasArts themselves proved with *Grim Fandango*.

T. LIAM MCDONALD
is a veteran gamer and game writer. His reviews appear regularly in *PC Gamer* and other publications. Write him at **tmcdonald@maximumpc.com.**

Ultima IX Ascension was, to my surprise, far less of a disappointment, despite some sloppy programming. I had two soft crashes within the first 20 minutes, and the game was fairly sluggish on even my high-powered system. The frame chop was only intermittent; the bigger problem was the pacing itself. If Avatar didn't run everywhere—and even if he did—movement was painfully slow. Patience is rewarded, however, with a gameworld of remarkable richness. Avatar has his share of stupid jumping and climbing to do, but the story, quests, characters, and interface are very, very strong. Third-person camera movement is handled well, apparently by rigorous scripting. I was rarely left staring at a wall or at Avatar's back while something gnawed on my limbs.

Maybe there *is* hope for third-person games... ✹

Monday Morning Q-Backing

THE T-MAN PROVIDES SECOND LOOKS AT THE GAMES HE MASSACRED IN DECEMBER

Random Thoughts

▶ God bless Sid Meier, whose *Antietam!* arrived in the same slim, plastic snap case in which DVDs are packaged. What a brilliant idea, to save trees and shelf space while giving your game visibility. This is what all games should be doing, and with Sid leading the way, there may be a chance of it happening. If it's good enough for an Adam Sandler movie, it should be good enough for *Q-bert* (though between the two, I think *Q-bert* has greater aspirations to high art).

▶ The DVD from WinStar of *Infinity's Child* is essential for anyone who loves computer animation. The disc includes more than just the beautiful, hallucinatory head film. There's also a full-featured trial version of *Bryce 4.0*, the user-friendly animation tool from MetaCreations. Several of the film's sequences are included as raw files that can be manipulated and edited using *Bryce*, bringing DVD-ROM film interactivity to a new level.

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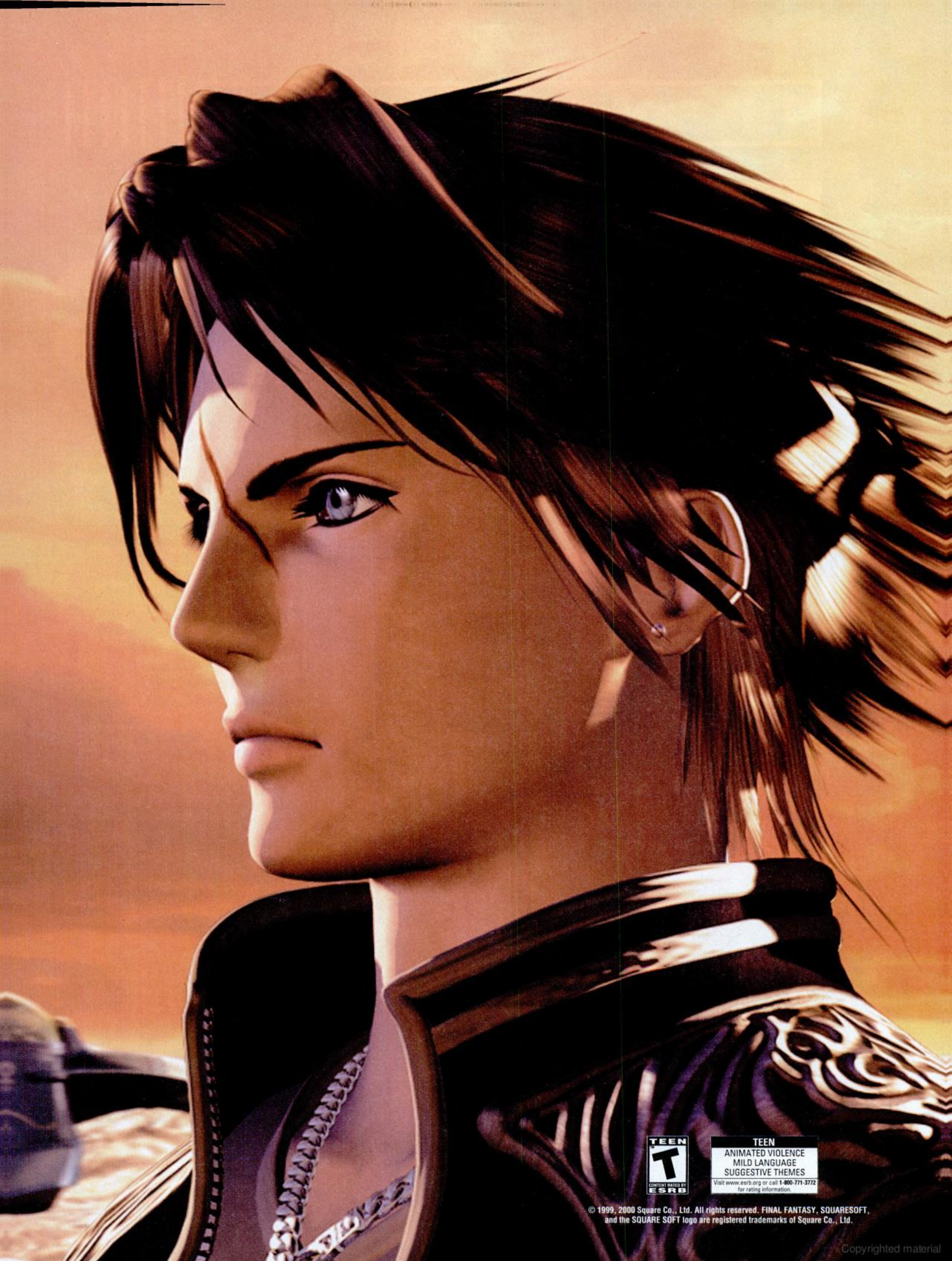

TEEN
T
CONTENT RATED BY ESRB

TEEN
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MILD LANGUAGE
SUGGESTIVE THEMES
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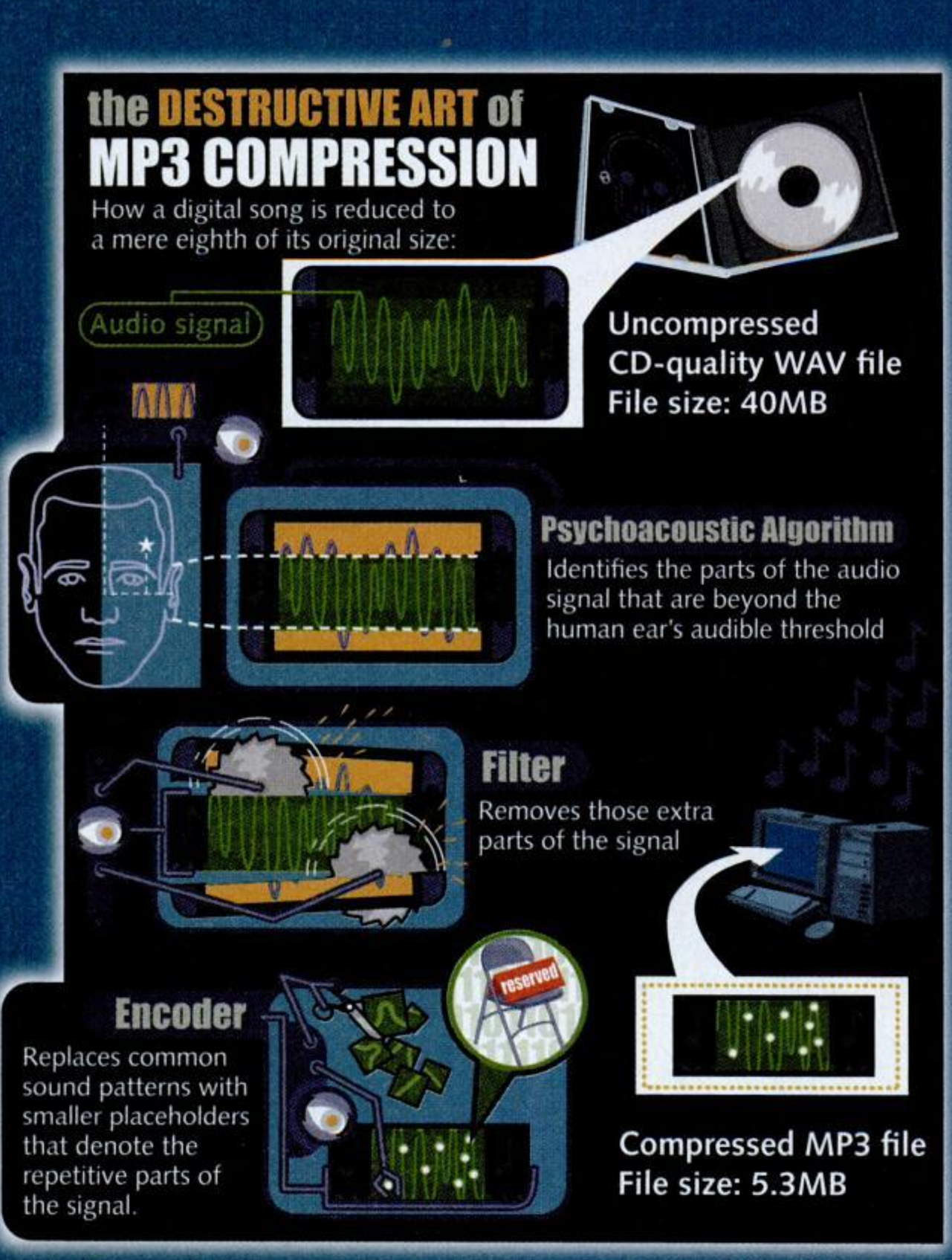
THE COMPLETE GUIDE TO

MP3s

Downloadable music has become the Internet's hottest property. Here's how legions of MP3 fanatics are finding, grabbing, and playing today's hit tunes.


the DESTRUCTIVE ART of
MP3 COMPRESSION
How a digital song is reduced to a mere eighth of its original size:
Audio signal
Uncompressed CD-quality WAV file
File size: 40MB
Psychoacoustic Algorithm
Identifies the parts of the audio signal that are beyond the human ear's audible threshold
Filter
Removes those extra parts of the signal
Encoder
Replaces common sound patterns with smaller placeholders that denote the repetitive parts of the signal.
reserved
Compressed MP3 file
File size: 5.3MB

It seems every power-user with a fast Internet connection has jumped aboard the MP3 party train. The MP3 allure is addictive, to say the least.

MP3 stands for "MPEG Audio Layer 3," the official name of a compression algorithm that can reduce CD music tracks to one-eighth their normal size with only the slightest degradation in audio quality. And because MP3 files are so small, they can be downloaded in a flash by broadband Internet users. We're talking an entire album's worth of music in less than 10 minutes.

Make no mistake, distributing copyrighted MP3s is illegal, and most of the files swapped online are hot (see the sidebar on page 50). Hence, the music recording industry is very concerned about MP3 propagation. Nonetheless, a growing number of legitimate businesses are nurturing a nation of desktop music pirates. Big-name dot-coms offer robust search engines that link to millions of illegal MP3s sitting on renegade FTP servers. CD-Recorder companies bundle cheery software that helps you rip content off your audio discs and encode it to MP3. And corporations as apple pie as (ahem) Sony are rushing out portable MP3 players. Of course, this hearty embrace of the MP3 groundswell is entirely legal in and of itself. It's not wrong to copy and listen to CD audio tracks that you already own.

On the next few pages, we'll introduce you to the fastest-growing hobby among PC die-hards. To endorse illegal activity would be just plain wrong, but to ignore what's really going on among MP3 fanatics would mean shirking our duties as journalists. We'd like you to read our reportage, and tell us what you think of the issues surrounding MP3s. If you'd like an in-depth look at the anatomy of any MP3 file, go to **www.id3.org/mp3frame.html**. If you need more general information, check out a book called *The MP3 and Internet Audio Handbook* by Bruce Fries.

Until the recording industry finds a way to address its MP3 woes, the compression format will continue to thrive. Here are the facts. Use them to make your own informed decisions.

ILLUSTRATIONS BY SCOTT PECK • INFOGRAPHIC BY XPLANE

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HOW TO make and play 'em

You know what MP3s are, and why the suits are cranked up about them. But do you know how to make and play them? Using the programs reviewed here, you can record, edit, play, store, and sort the songs of your choice. MP3 software is so intuitive, it would be ludicrous to walk you through the "steps" of using it. But the programs do dramatically differ in quality and features, so it's time for us to separate the Benzos from the hoopties.

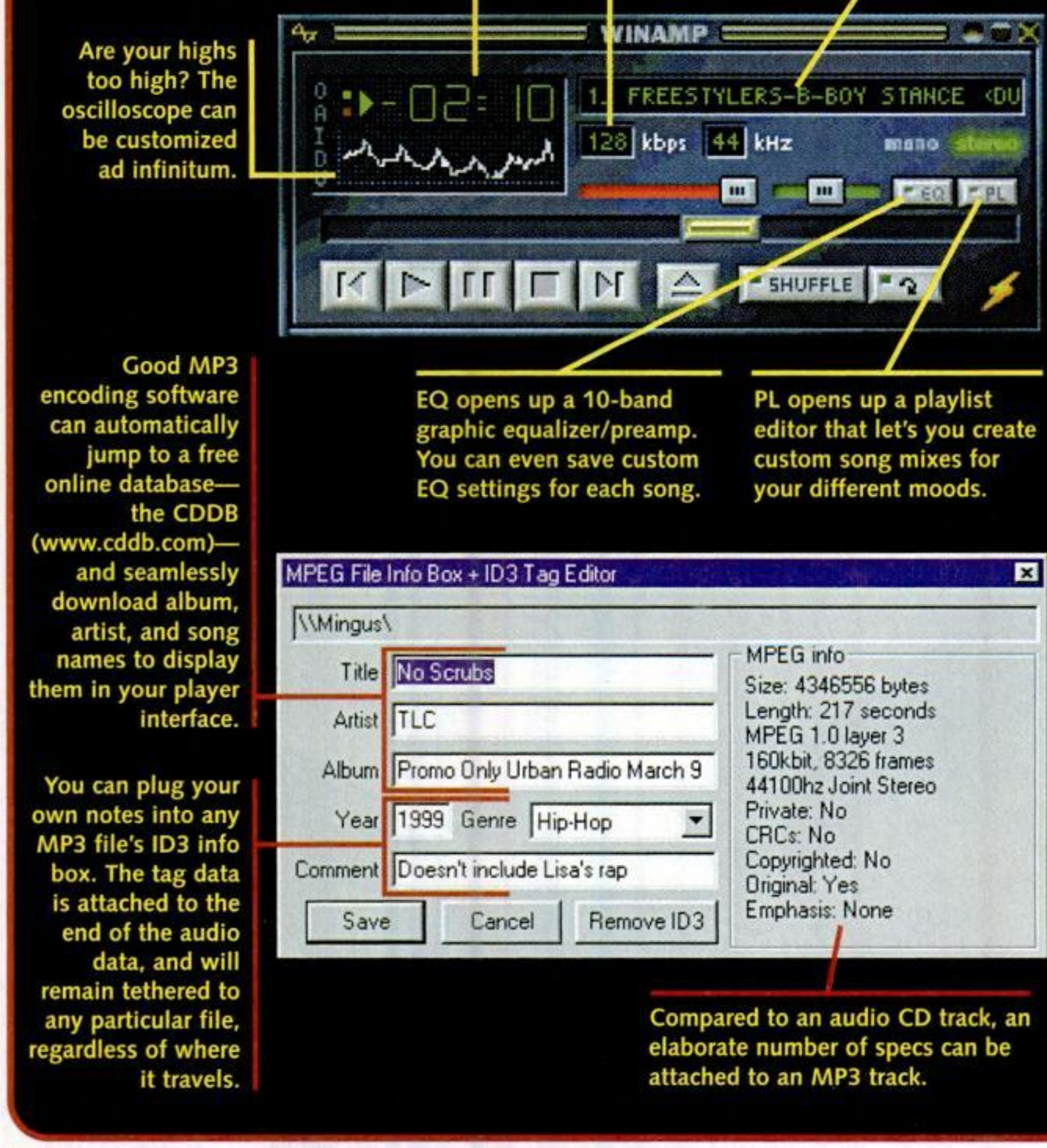
The all-in-one utilities perform all of the functions mentioned above—extracting tracks from audio CDs and saving them to your hard drive (a.k.a, "ripping"); converting these WAV files to MP3 format (a.k.a., encoding); actually playing the MP3s; and organizing gigantic file lists. These utilities generally cost between zilch and $30, and include everything you'll need to get started in the MP3 scene.

Most tenured MP3 fanatics ditch the players built into all-in-one-utilities for dedicated playback software. These players are usually freeware, and include basic playback functions, a sound visualization display, a playlist utility for sorting and organizing your tunes, and a rudimentary equalizer. Good players will demand minimal system resources.

For the reviews below, we benchmarked the software that offered one-button ripping/encoding. Our test file ("Tonight, Tonight" by the Smashing Pumpkins) was 4:14 minutes long, and encoded at 128Kbps.

know your player interface

Compared to the lame music player that ships with Windows, good MP3 playback software offers more control than the cockpit of a jet airplane. *Winamp* boasts a clean, stream-lined interface, so we'll use it to point out common features.


Song duration can be reported by time elapsed or time remaining.
True aficionados will want a bitrate report. The higher the bitrate, the better your audio quality.
Rolling title marquees! Are we in Times Square?
Are your highs too high? The oscilloscope can be customized ad infinitum.
WINAMP
1. FREESTYLERS-B-BOY STANCE
128 kbps
44 kHz
mono
stereo
EQ
PL
SHUFFLE
Good MP3 encoding software can automatically jump to a free online database—the CDDB (www.cddb.com)—and seamlessly download album, artist, and song names to display them in your player interface.
EQ opens up a 10-band graphic equalizer/preamp. You can even save custom EQ settings for each song.
PL opens up a playlist editor that let's you create custom song mixes for your different moods.
MPEG File Info Box + ID3 Tag Editor
\\Mingus\
Title No Scrubs
Artist TLC
Album Promo Only Urban Radio March 9
Year 1999 Genre Hip-Hop
Comment Doesn't include Lisa's rap
Save
Cancel
Remove ID3
MPEG info
Size: 4346556 bytes
Length: 217 seconds
MPEG 1.0 layer 3
160kbit, 8326 frames
44100hz Joint Stereo
Private: No
CRCs: No
Copyrighted: No
Original: Yes
Emphasis: None
You can plug your own notes into any MP3 file's ID3 info box. The tag data is attached to the end of the audio data, and will remain tethered to any particular file, regardless of where it travels.
Compared to an audio CD track, an elaborate number of specs can be attached to an MP3 track.

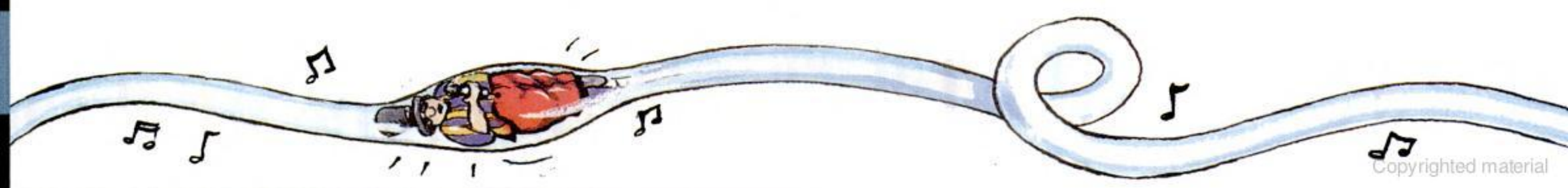
MusicMatch Jukebox

FUNCTIONS all-in-one
$30, www.musicmatch.com
VERDICT
1 2 3 4 5 6 7 **8** 9 10

MusicMatch is the best damn CD ripper/MP3 encoding software we've used. Its only downside is its pathetic player, which is terribly under-featured compared to *Winamp* and *Sonique*. Still, compared to players integrated with the other all-in-one utilities tested, *MusicMatch*'s player is absolutely golden.

All the crazy features are present, including, but not limited to: CDDB connectivity; configurable archiving and storage; a playlist editor; and, oh yeah, who could forget, ripping and encoding. *MusicMatch* even includes interfaces for popular hardware players. Download a song to your player, and *MusicMatch* will optimize its bitrate to maximize the amount of music you can tote.

MusicMatch uses the excellent Xaudio encoder, which produces crisp, clear sound with rich highs and lows. The Xaudio encoder will encode Constant Bit Rate, Variable Bit Rate, and WMA formats at all bitrates from 8Kbps to 320Kbps (see recording sidebar). It'll even rip CD tracks—in digital or analog mode—to straight WAV files if you want to eat drive space like Homer Simpson eats donuts. This is your weapon if you want to stick it to the man and make your own MP3s. Ripping/Encoding Speed: 40 sec.



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Real Jukebox Pro

FUNCTIONS all-in-one
$30, www.realjukebox.com
VERDICT

1 **2** 3 4 5 6 7 8 9 10

Real Jukebox rips and encodes CDs to MP3s. That's about the only positive thing to say about it, except for the fact that it might be more aptly named *Real Pukebox*. It's buggy and confusing, and crashed all three systems it was tested on. At least it isn't secretly tracking our listening habits and uploading them to marketing goons—anymore.

No one wants to manually edit MP3 ID3 tags, and this task shouldn't be necessary, given that anyone online has free access to the CDDB. *Real Jukebox Pro* does support CDDB, but it doesn't allow you to choose which server to use. So, with several million copies of *Real Jukebox* downloaded, the default CDDB server is totally slammed most of the time—and that means no CDDB for you! Blech.

The Gestapo could have learned a lesson or two from the way *Real Jukebox Pro* handles file associations. If you miss one innocuous little checkbox during setup, *Real Jukebox Pro* will repossess the associations without prompting you. How frustrating. Naturally, the option to disable this is buried three menus deep where no one will ever venture. Blech again.

Real Jukebox Pro does do a good job of actually ripping and encoding MP3s. Thanks to its Xing encoder, sound quality and speed are comparable to *MusicMatch*—but this isn't enough reason to recommend *Real Jukebox* to anyone. Ripping/Encoding speed: 40 sec.

Audiocatalyst

FUNCTIONS all-in-one
$30, www.audiocatalyst.com
VERDICT

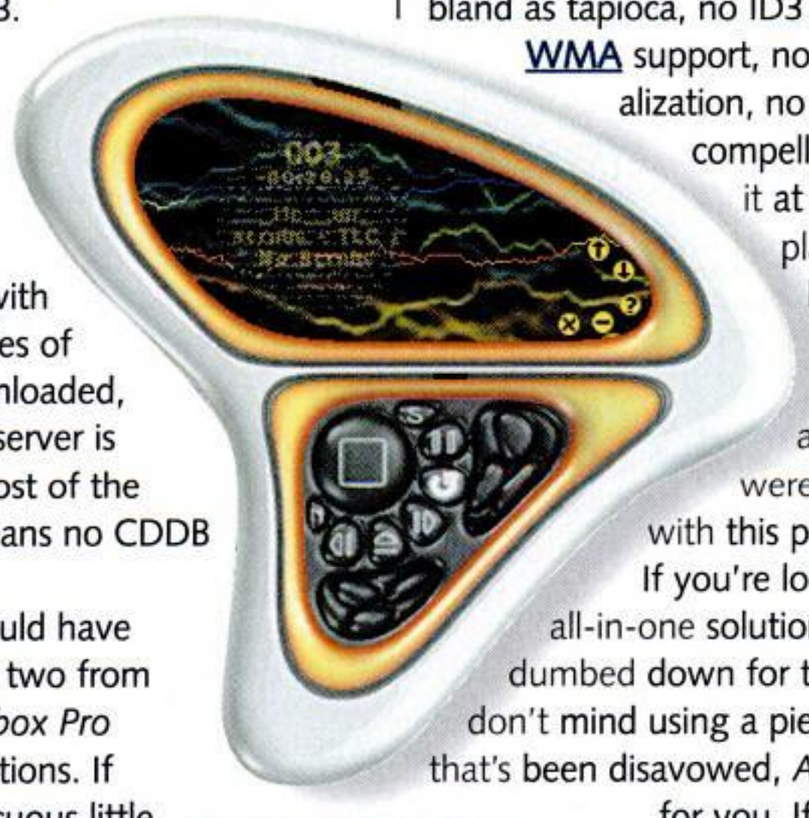
1 2 3 4 5 **6** 7 8 9 10

Before RealNetworks bought Xing in order to use its encoder in *Real Jukebox*, Xing had a nifty suite of MP3 utilities sold under the name *AudioCatalyst*. Being good capitalists, Xing continues to sell *AudioCatalyst*, but isn't maintaining it anymore. *AudioCatalyst* is still a powerful program, but isn't as modern as some of its competitors.

The utility is based on the very cool *Audiograbber* CD ripper, but Xing also integrated its blazing-fast MP3 encoder to great effect. On the ripping front, *AudioCatalyst* offers all the groovy features of *Audiograbber* and encodes tunes as fast as either *Real Jukebox* or *MusicMatch*, with excellent audio quality.

AudioCatalyst's only failings are its lack of support from Real, and the embarrassing *XingMP3* player. With an interface as bland as tapioca, no ID3 tag support, no WMA support, no soundwave visualization, no equalizer, and no compelling reason to use it at all, the *XingMP3* player should have been left out of the package entirely—what if a witless beginner were to actually stick with this player?

If you're looking for an all-in-one solution that's not dumbed down for the masses, and don't mind using a piece of software that's been disavowed, *AudioCatalyst* is for you. If you want an all-in-one solution that can rip, encode, archive, and play your tunes, look elsewhere. If the kids at Real were clever, they'd ditch their abysmal *Jukebox*, and spend some time enhancing *AudioCatalyst* and updating the player. As it stands now, Real owns a has-been and an also-ran. Ripping/Encoding speed: 42 seconds.



The Sonique player can adopt funky new skins and visualization displays at will.

Audiograbber

FUNCTION ripper
$25, www.audiograbber.com-us.net
VERDICT

1 2 3 **4** 5 6 7 8 9 10

If you're looking for a cheap way to make MP3s, *Audiograbber* is your ticket to online music. Unfortunately, cheaper isn't always better.

When cooking up MP3s was a relatively new art, dominated by command

BUSTED!

THE TALE OF ONE MP3 PIRATE

Think no one knows that you're hosting an MP3 site? That's what Jeffrey Gerald Levy, age 22, thought—until FBI agents showed up at his Eugene, OR, apartment last year with a search warrant in hand.

A student at the University of Oregon, Levy holds the ignominious title of being the first person convicted under the No Electronic Theft Act. Congress approved the NET act in 1997 to help fight copyright violations. FBI agents busted Levy for running a warez server hosting gigabytes of illegal software, movies, and MP3s.

The penalty for violating the NET Act can be painful. Reproducing or distributing more than $1,000 in copyrighted material is a misdemeanor, and could land you a year in jail, and a fine of up to $100,000. If you're busted distributing more than 10 copyrighted pieces worth more than $2,500, it's a felony with a maximum sentence of three years in prison and a $250,000 fine.

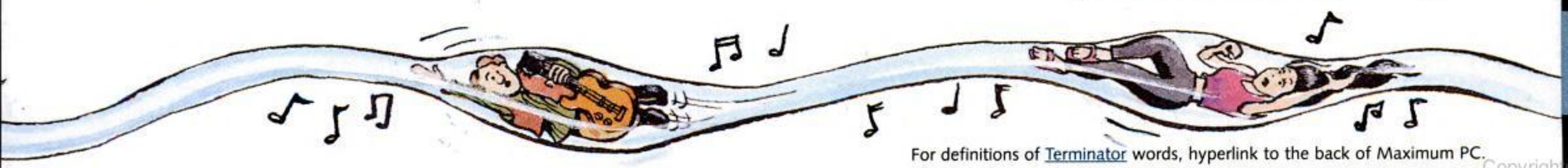
In Levy's case, investigators tracked him down through unusually high bandwidth suckage on his university account. It's not a wholly new twist on policing—cops have long busted pot farmers by looking at their electricity and water use—but it does mark the first time that the strategy has been used to fight "new media crime."

Police estimate Levy had some $70,000 in pirated media on his site. While the case is being touted as a successful prosecution, the penalties may leave people wondering if the law really has any teeth. Levy pleaded guilty to a felony violation of copyright laws, but in the end, he got off with two year's probation and no fine. Why such a puny sentence if the Feds are really getting serious?

Assistant U.S. Attorney Sean Hoar says the problem with the case was the inability to prove how much software had been illegally distributed by Levy. Levy had been running the warez site for about two years, but the Feds were only able to prove about $5,000 in losses due to a lack of detailed network logs, Hoar says. Nonetheless, the relative success of the case has encouraged Federal prosecutors to begin pursuing other pirate distributors, Hoar says.

The FBI says Levy knew he was breaking the law.

"He checked into it, and heard the FBI didn't enforce the laws," says FBI Agent Jamie Barrett, the lead investigator on the case. "He also rationalized it, and didn't think he was hurting the companies."



For definitions of Terminator words, hyperlink to the back of Maximum PC.

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line utilities like l3enc.exe and its brethren, *Audiograbber* stepped in with an easy-to-use graphical interface for ripping CDs, and the ability to send data to any of the MP3 encoders available at the time. It would even connect to the CDDB to find out what CD you were listening to, and name the MP3s you encoded. *Audiograbber* was so smooth, Xing made it the cornerstone of *AudioCatalyst*, its all-in-one MP3 suite.

As would be expected of a dedicated ripper, *Audiograbber* has extra features to help you clean up, name, and normalize the volume on your ripped WAV files before they're converted to MP3s; in this respect, it bests any of the all-in-one utilities. But is this enough to make up for the lack of an encoder, or any type of player? Nope.

Audiograbber is a great CD ripper, but at $25, it just ain't a good deal. For a mere $5 more, you can grab *AudioCatalyst* or *MusicMatch Jukebox*, both of which come with better and faster MP3 encoders than are freely available online.

sonique

FUNCTION player

free, www.sonique.com

VERDICT

1 2 3 4 5 6 7 8 **9** 10

Always a fan of populist freeware, we wanted to like *Sonique*, and weren't disappointed. This is a kick-ass player. Sporting a unique, pop-art design, a powerful interface, awesome visualization tools, and the richest sound of the players reviewed, *Sonique* isn't tough to love. Our only gripes are its anemic playlist editor, and its GUI, which was initially confusing.

But once you understand the browsing metaphor that *Sonique* employs, the program becomes quite intuitive, and much more versatile than the other players reviewed. And if you don't like the basic interface, you can make your own, care of excellent skin support. Another supercool feature is *Sonique*'s pitch control, which allows you to play your tunes at anything from one-half to two times normal speed. None of the other players reviewed will do this, and while it's not something you'd do every day, it's definitely good for an occasional laugh.

Like *Winamp*, *Sonique* plays all the audio formats your computer understands. It's a little more CPU-intensive than *Winamp*, but not so much that it'll cramp your style. Download it, play around with it, and tell us if it doesn't blow your mind.

winamp

FUNCTION player

free, www.winamp.com

VERDICT

1 2 3 4 5 6 7 8 **9** 10

Winamp has been the player favorite since the MP3 scene exploded, and for good reason. It offers an easy-to-use (albeit plain) interface, the best playlist editor we've seen, and crystal-clear audio. Factor in CPU utilization that's so low, you can frag away in *Quake III* while still enjoying the sweet, sweet melodies of Yanni, and you've got a winner. Its skin and plug-in support are also the best around; legions of underground developers come up with new *Winamp* add-ons every week.

An MP3 Player for Your Car!

We show you how to build one in the **March issue**.

And in the **April issue**: Portable MP3 hardware players reviewed and rated!

But nothing's perfect, and *Winamp* is no exception. The built-in oscilloscope, while hip and groovy two years ago, isn't much compared to the visual stylings of the *Sonique* viewer, so you'll want to install a better visualization plug-in. *Winamp* also seems more prone to crashes than other players. *Winamp* plays all your favorite formats: MP3, WAV, audio CD, and WMA. Whether you like *Winamp* or *Sonique* better is a matter of personal preference. They're both free, so experiment.

— Reviews by Will "Gonzo" Smith

Advanced Recording Tips

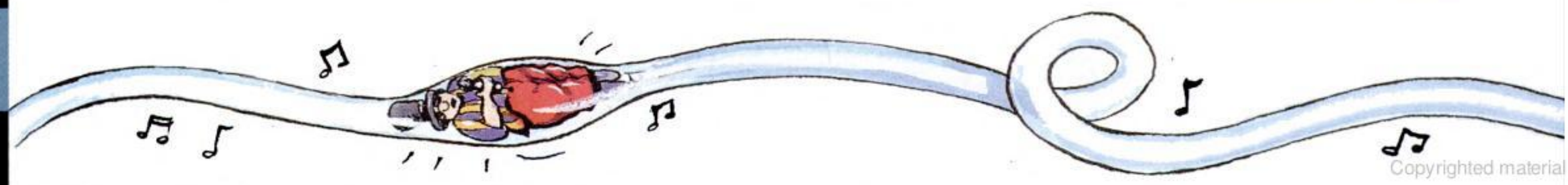
Converting CDs to MP3 format isn't always a straightforward affair. Here are some tips to help you improve audio quality.

▶ **Digital vs. Analog ripping:** For minimum ripping times, rip digitally. For maximum quality, rip analog. Basic digital ripping grabs audio as fast as your CD-ROM drive can pipe it to your motherboard, and ignores errors. Analog ripping uses the analog output of your CD-ROM drive to pipe audio to your soundcard, which then captures the signal at 1x speed. This means if you do a rip of a three-minute CD audio track, it will take at least three minutes to complete. Most ripping utilities have a feature that allows error correction on digital rips—so, if you're a middle-of-the-road type, rip digitally with error correction on. This strikes an ideal balance between fidelity and speed.

▶ **Bitrate, bitrate, bitrate.** We can't say it enough. It is absolutely vital to use the proper bitrate for the type of music you're encoding. Generally, most rock and alternative music will encode just fine at 128Kbps, and sound great at 160Kbps. Classical and jazz tunes require more bandwidth because they contain more audio information, so you'll need to encode them at a minimum of 160Kbps and preferably 192Kbps. Anything with a lot of strings requires more bandwidth. The more complex your music is, the higher your bitrate needs to be.

▶ **Constant Bitrate vs. Variable Bitrate.** Whether Constant Bitrate (CBR) or Variable Bitrate (VBR) sounds better is a matter of debate, but both have advantages and disadvantages. The old-school method—CBR—encodes an entire MP3 at a predefined bitrate. Not too long ago, however, some clever individual realized that you could lower the bitrate during sections of a song that don't contain as much data, and thus was born VBR. The theory is that you can get better quality with a VBR file than you can with a similar-size CBR file—the high-data sections can be recorded at a high bitrate, the low-data sections can be recorded at a lower rate without a noticeable quality hit, and your file sizes will remain reasonable. Unfortunately many players (hardware and software) don't groove to the VBR beat. VBR is also much less forgiving of bad encoding.

▶ **Vinyl to MP3:** If you want to make MP3s from your old LPs, we recommend getting a copy of Adaptec *Easy CD Creator*, which includes a handy little utility called CD Spin Doctor. Spin Doctor provides a bozo-proof way to grab audio from an analog source, and save it as a WAV file. Spin Doctor will remove pops, clicks, hiss, and other analog artifacts. The package even comes with a RCA-to-mini-DIN cable, so you can connect your turntable or tape deck to your sound card. Once you've saved your song to WAV format, you should be able to encode it using any MP3 encoder.



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HOW TO put 'em on a CD

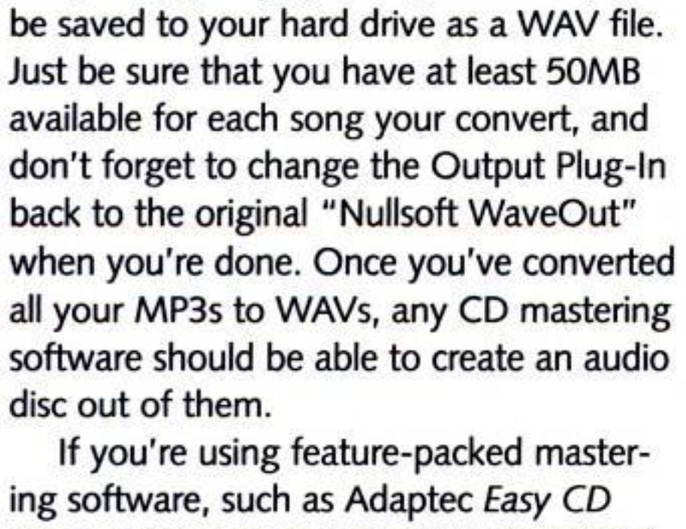
With a CD-Recorder and a stack of blank discs, you can archive your entire MP3 collection, 650MB at a time. You can also record your favorite MP3s as high-quality CD audio tracks that can be played in any standard audio CD player.

An MP3 is just another data file, so simple archiving is a straightforward process—just drag the MP3 files into the CD layout window and hit "burn." Any decent CD mastering software can be used to burn a data CD, but only really good CD mastering suites can graciously accept any old audio file—a WAV or an MP3—dress it up, and serve it on a platter, all in one fell swoop.

If your CD mastering software isn't MP3 savvy, you'll first need to convert your MP3s into WAV format. Here's a rundown of that process using *WinAmp*:

First, open *WinAmp* preferences, click on the Audio I/O tab, and, from the Output Plug-Ins section, select the built-in "Nullsoft Disk Writer." After you use the Configure button to choose where you want to save the converted WAV files, every song you play through *WinAmp* will be saved to your hard drive as a WAV file. Just be sure that you have at least 50MB available for each song your convert, and don't forget to change the Output Plug-In back to the original "Nullsoft WaveOut" when you're done. Once you've converted all your MP3s to WAVs, any CD mastering software should be able to create an audio disc out of them.

If you're using feature-packed mastering software, such as Adaptec *Easy CD Creator 4.0* or CeQuadrat *WinOnCD 3.7*, you can clean your audio files, normalize the volume across different tracks, and burn your MP3s directly to audio CD format. The MP3s will be converted on the fly, fed to the recorder's buffer, and then burnt to disc—it's really that simple. Ensure that the drive that holds your MP3s can keep up with your CD recorder; ideally, it should be capable of read speeds that are two times your recording speed.



Besides decoding MP3s on the fly during the disc burning process, Easy CD Creator 4.0 allows excellent control over track pauses and cross fades.

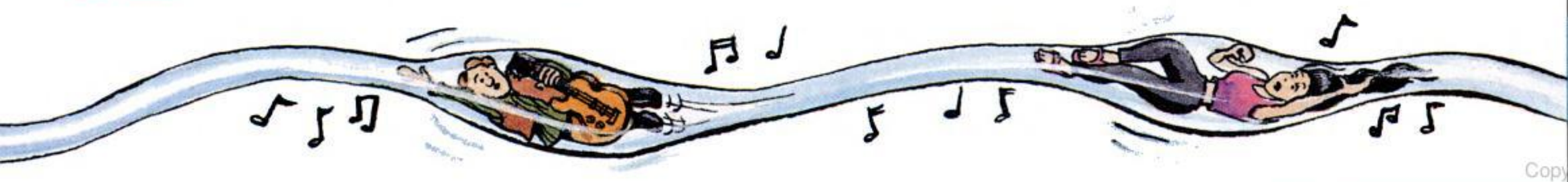
Tips for creating audio CDs

▶ Burning audio discs using the disc-at-once method gives you more control over transitions between audio tracks. By default, audio discs are burned track-at-once, and a two-second pause is automatically inserted between each song. Since disc-at-once burns the entire disc in one session, without turning off the laser, you can make your songs run together, do a cross fade, or even insert a pregnant pause between songs.

▶ If you have about 700MB of free hard drive space, you can completely eliminate the chances of a fatal buffer underrun by creating your CD from an image file. An image file contains all the info and pointers necessary to represent your data as it will appear on a CD. This is also the easiest way to create multiple copies of the same CD.

▶ Doing a test write before actually burning your CD will save you major heartaches. A successful test write tells you whether you'll get over the biggest hurdle of CD recording: keeping the CD recorder's buffer full throughout the entire process.

▶ Run your files through a normalizer, which will level out the volume over each audio track, before you commit them to disc. This gets rid of the wildly ranging volume levels that make your CD sound like a cassette tape instead of a digitally mixed labor of love.



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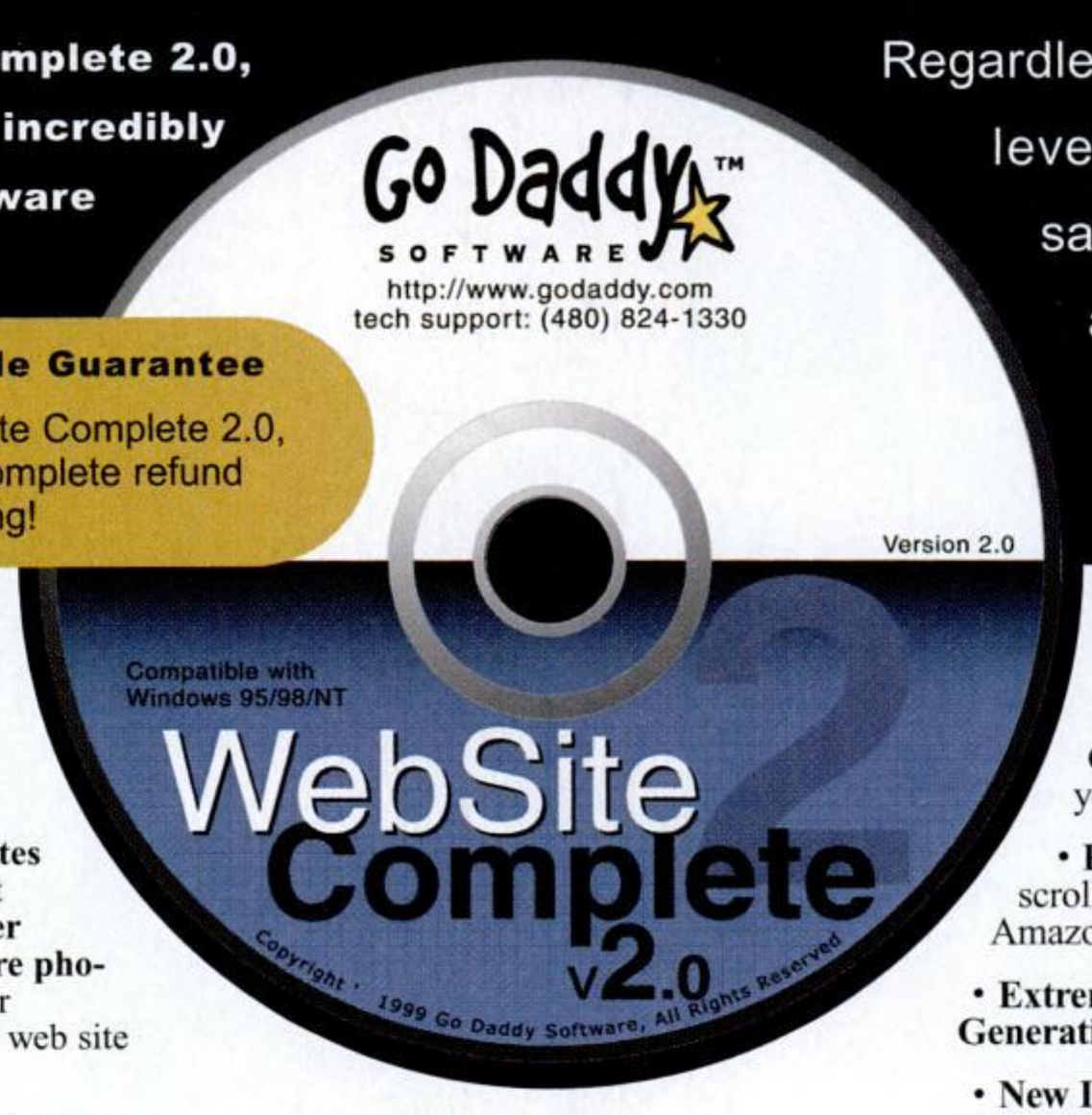

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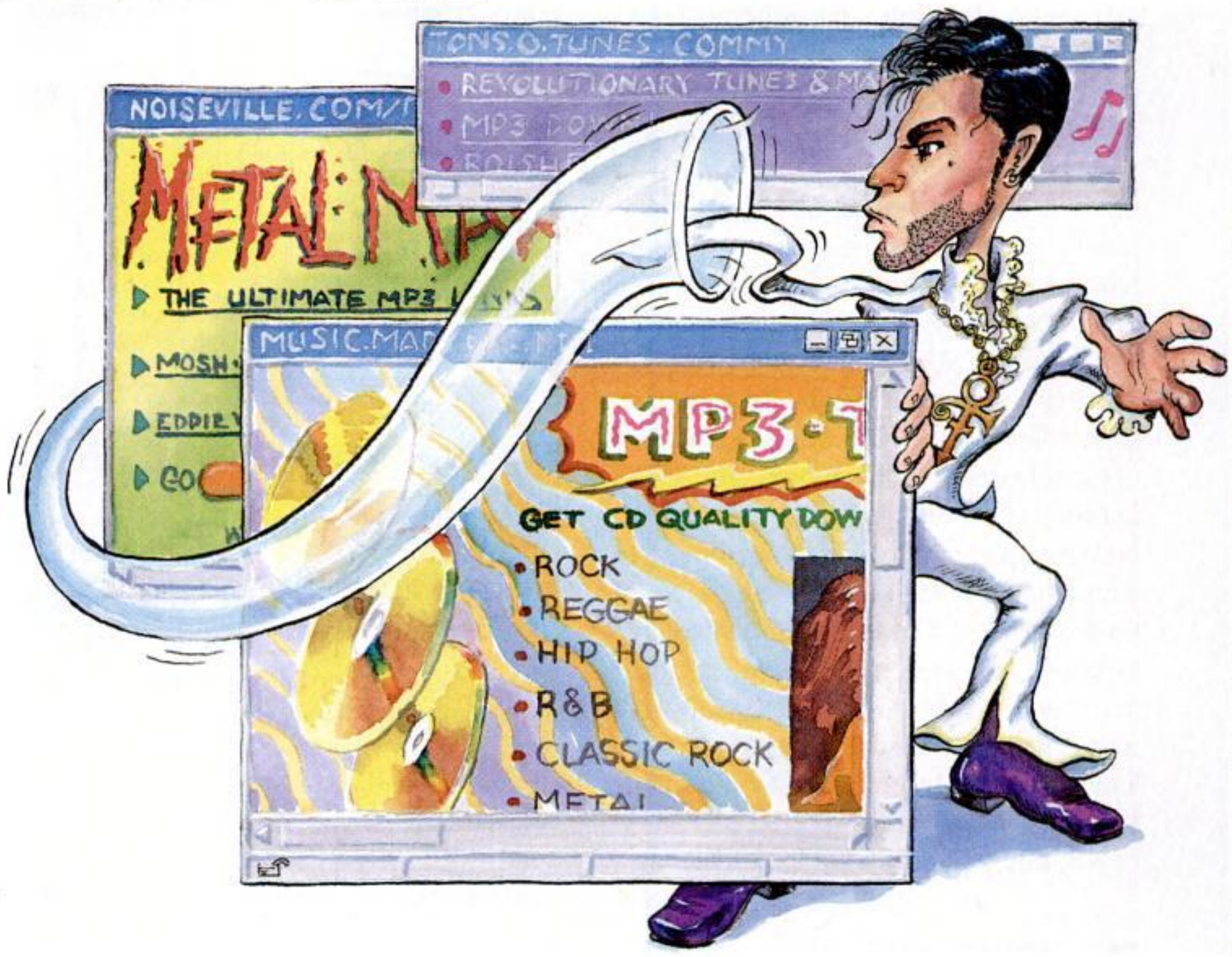
HOW TO find 'em

If you're itchin' to download some song files, you'll want a high-speed net connection. MP3s might be cannily compressed, but a 4.5 minute song will still run you about 4MB—which can take more than nine minutes to download over a 56K modem. Second, you'll need some robust client software: a web browser, a Usenet newsgroup reader, an FTP client, and maybe even a miraculous little app called *Napster*. Third, you'll need some basic searching advice, because none of the truly worthwhile MP3s link directly off of web-searchable pages. Fourth, you should always remember that downloading pirated music is illegal.



Newsgroup searching

Welcome to Usenet, the world of threaded Internet discussion groups. Back in the early 90s, before the modern web even existed, sharing opinions via Usenet was all the rage. Today, however, most people access message forums over a web interface, and Usenet communication has been relegated to underground geek status. But, wouldn't you know it, geeks trade MP3s, and scores of genre-specific newsgroups are devoted to swapping not messages, but music files.

Grabbing MP3s off of Usenet is potentially the fastest way to download music. All Usenet messages—be they simple text messages or messages including MP3 attachments—are distributed across the Internet via a network of dedicated "news servers." When little Timmy Masters of Anywhere, Ohio, uploads that Kid Rock MP3 to Usenet, the file travels from his hard drive to his ISP's news server, which then sends the file to the news server of the next closest ISP—and so on, and so on. The file eventually makes its way onto the news server of every ISP on the planet.

The beauty part is that Timmy's news server is a native node of his ISP's internal network. So, when he downloads an MP3 from his local news server, he doesn't have to deal with a multiple number of router hops, external Internet congestion, and finicky FTP servers belonging to people who may or may not let him sample their wares. News server downloads thus transpire extremely quickly, especially over a DSL connection, which maintains a constant, unflinching throughput rate between user and provider.

There's also an elegant order to how MP3s are organized on Usenet. Because all the MP3 newsgroups are divided by a logical nomenclature—that is, either by genre or by historical era—Timmy can identify the groups that interest him the most, and then go trolling for gems at his leisure.

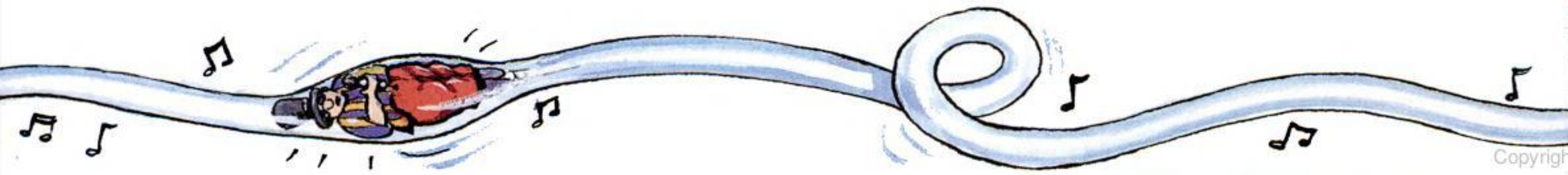
The specificity of some groups is downright freaky. While the group **alt.binaries.sounds.mp3.1990s** should appeal to anyone who watches MTV, the group **alt.binaries.sounds.mp3.zappa** serves more discriminating tastes. And it's always enlightening to drop in on the newsgroup of an obscure genre to dig what a particular fan base deems most swapworthy.

Both Netscape *Communicator* and Microsoft *Internet Explorer* include newsreader software, but we much prefer robust, dedicated clients like Forte *Agent* (**www.forteinc.com**) and MicroPlanet *Gravity* (**www.microplanet.com**). Among other niceties, these apps can transparently recombine MP3 files, which are by rote always broken up and distributed across multiple messages.

So, how does Timmy actually garner his MP3s? Well, after he's entered his news server's address in his newsreader's preference settings, he downloads the list of all the newsgroups offered by his news server. It's important to note that some ISPs don't serve binaries newsgroups. Because binary files are so large (and sometimes illegal), some ISPs just don't want to deal with the bandwidth, storage, and legal trouble.

After Timmy has retrieved the entire group list, he does a search for groups with MP3 attachments (all the relevant ones start with **alt.binaries.sounds.mp3**; the final extension will be era- or genre-specific). Timmy next subscribes to the groups he wants to troll, and downloads the messages of each group.

Once he has hit this stage, Timmy goes into a newsgroup and looks for songs he wants to download. Because Usenet MP3 files are divided across multiple messages, Timmy won't be able to download a complete song unless all the necessary messages are sitting on his news server. In Agent, song names that end with a "star-slash-numeral" syntax—for example,



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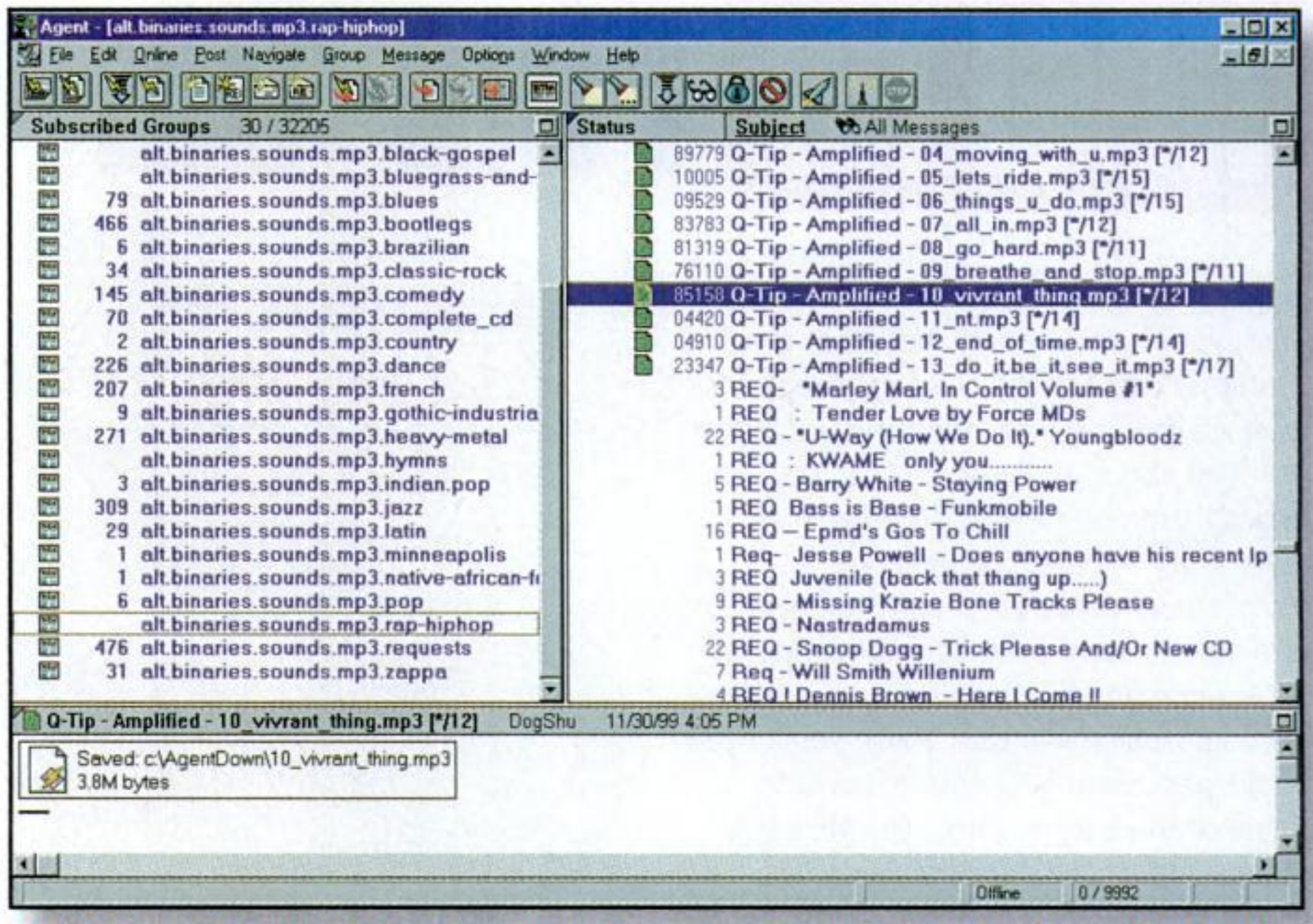
MP3s

"[*/9]"—denote that all the necessary messages are present on the server. In *Agent*, Timmy can download the file by selecting it, and simply hitting the letter "A" on his keyboard. This will download each individual segment of the song, recombine the segments, and save the complete file in a designated directory.

If Timmy wants to request a song from his buddies, traditional Usenet etiquette demands that he enter a special newsgroup—**alt.binaries.sounds.mp3.requests**—and post a request message. The syntax is "REQ" followed by the name of the song he wants. Anyone so inclined to fulfill his request will then upload the song to the appropriate decade-based newsgroup. Modern newsgroup etiquette also allows Timmy to jump into a genre-specific newsgroup and politely request a song the request will be uploaded into the very same newsgroup. In general, newsgroup denizens loathe repeat requests, annoying pleas, and lengthy subject headers. For a thorough (though slightly outdated) FAQ on MP3 newsgroups, go to **www.top.net/taenus**.


Agent - [alt.binaries.sounds.mp3.rap-hiphop]
File Edit Online Post Navigate Group Message Options Window Help
Subscribed Groups 30 / 32205
alt.binaries.sounds.mp3.black-gospel
alt.binaries.sounds.mp3.bluegrass-and-
79 alt.binaries.sounds.mp3.blues
466 alt.binaries.sounds.mp3.bootlegs
6 alt.binaries.sounds.mp3.brazilian
34 alt.binaries.sounds.mp3.classic-rock
145 alt.binaries.sounds.mp3.comedy
70 alt.binaries.sounds.mp3.complete_cd
2 alt.binaries.sounds.mp3.country
226 alt.binaries.sounds.mp3.dance
207 alt.binaries.sounds.mp3.french
9 alt.binaries.sounds.mp3.gothic-industria
271 alt.binaries.sounds.mp3.heavy-metal
alt.binaries.sounds.mp3.hymns
3 alt.binaries.sounds.mp3.indian.pop
309 alt.binaries.sounds.mp3.jazz
29 alt.binaries.sounds.mp3.latin
1 alt.binaries.sounds.mp3.minneapolis
1 alt.binaries.sounds.mp3.native-african-f
6 alt.binaries.sounds.mp3.pop
alt.binaries.sounds.mp3.rap-hiphop
476 alt.binaries.sounds.mp3.requests
31 alt.binaries.sounds.mp3.zappa
Status
Subject
All Messages
89779 Q-Tip - Amplified - 04_moving_with_u.mp3 [*/12]
10005 Q-Tip - Amplified - 05_lets_ride.mp3 [*/15]
09529 Q-Tip - Amplified - 06_things_u_do.mp3 [*/15]
83783 Q-Tip - Amplified - 07_all_in.mp3 [*/12]
81319 Q-Tip - Amplified - 08_go_hard.mp3 [*/11]
76110 Q-Tip - Amplified - 09_breathe_and_stop.mp3 [*/11]
85158 Q-Tip - Amplified - 10_vivrant_thing.mp3 [*/12]
04420 Q-Tip - Amplified - 11_nt.mp3 [*/14]
04910 Q-Tip - Amplified - 12_end_of_time.mp3 [*/14]
23347 Q-Tip - Amplified - 13_do_it,be_it,see_it.mp3 [*/17]
3 REQ- "Marley Marl, In Control Volume #1"
1 REQ : Tender Love by Force MDs
22 REQ - "U-Way (How We Do It)." Youngbloodz
1 REQ : KWAME only you.....
5 REQ - Barry White - Staying Power
1 REQ Bass is Base - Funkmobile
16 REQ – Epmd's Gos To Chill
1 Req- Jesse Powell - Does anyone have his recent lp
3 REQ Juvenile (back that thang up.....)
9 REQ - Missing Krazie Bone Tracks Please
3 REQ - Nastradamus
22 REQ - Snoop Dogg - Trick Please And/Or New CD
7 Req - Will Smith Willenium
4 REQ I Dennis Brown - Here I Come II
Q-Tip - Amplified - 10_vivrant_thing.mp3 [*/12] DogShu 11/30/99 4:05 PM
Saved: c:\AgentDown\10_vivrant_thing.mp3
3.8M bytes
Offline
0 / 9992

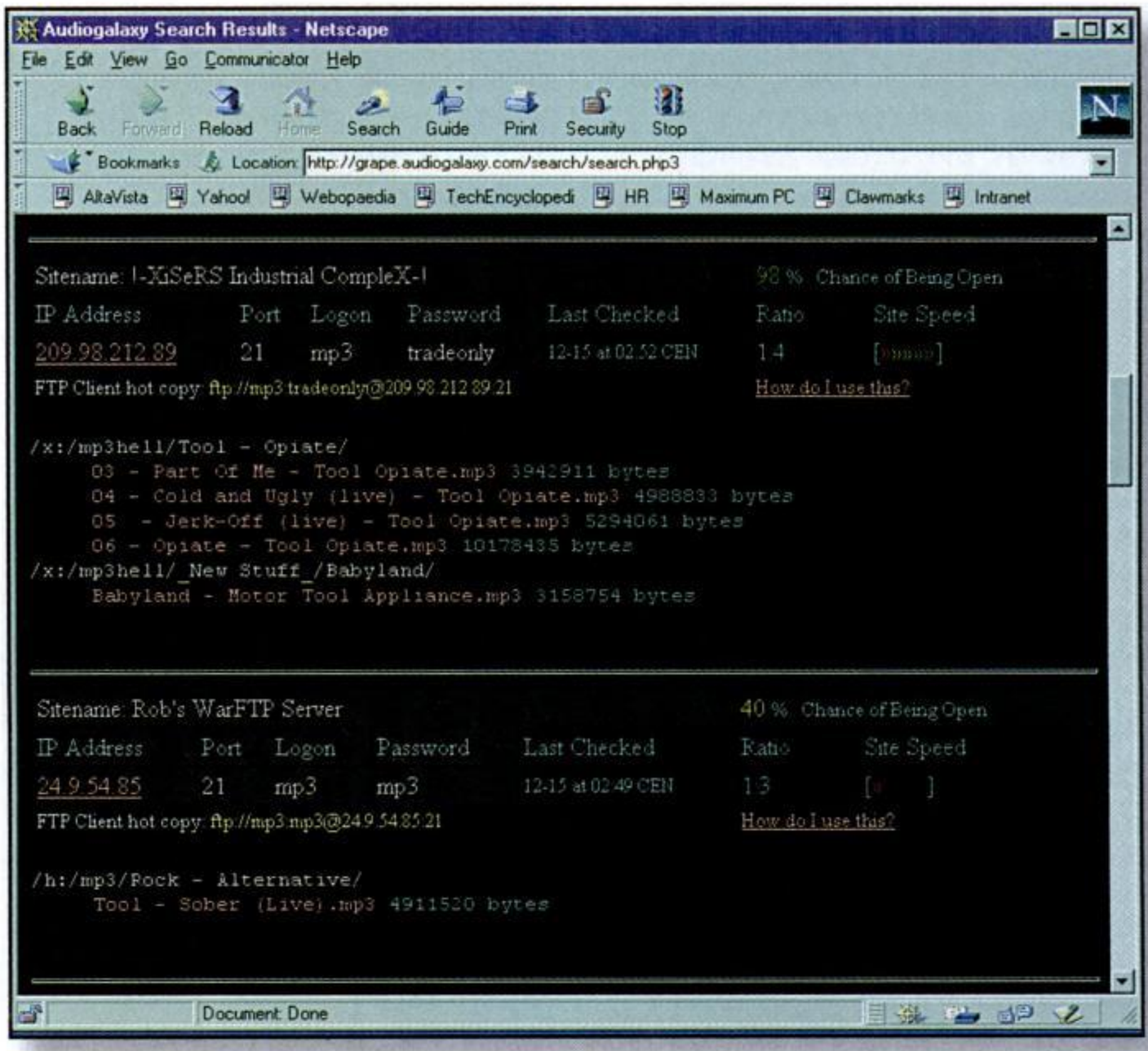
Here's the *Agent* newsreader interface. Notice the song names in the right-hand pane: The [*/12] syntax indicates that all the necessary parts of the MP3 are present and accounted for. And look at **all the polite and orderly song requests!**

FTP searching

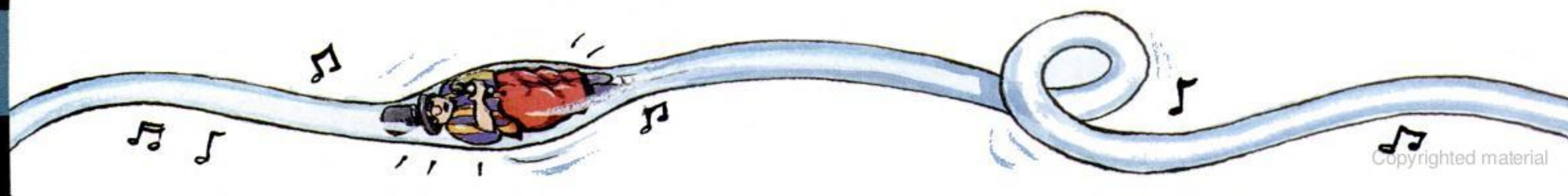
FTP stands for "File Transfer Protocol," a set of standardized programming instructions that describe how data is to be uploaded and downloaded from an Internet server. Thousands of amateur sysops have set up FTP servers to trade MP3s. The key for the wily Jimmy Masters of the world is to find the servers, and extract their content. The task requires a good FTP client such as GlobalScape's *CuteFTP* (**www.cuteftp.com**) or BulletProof's *BulletProof FTP* (**www.bpftp.com**). Jimmy's modus operandi is ostensibly basic: Establish a connection with the FTP server, rifle through its folders like he's raiding a stranger's refrigerator, and then download files to his own hard drive.

Unfortunately, the actual process is never that easy. First, FTP servers have a limited number of open ports, and Jimmy may have to wait for someone else to drop a connection before he can swoop in. Second, even if Jimmy does establish a connection, he probably won't be given immediate access to download whatever he wants.

Many FTP servers are "ratio servers." If an FTP server bears a 3-to-1 ratio, Jimmy will have to upload 3MB of MP3 goodness for every 1MB of music he wants to download. Only after earning sufficient "upload credits" will he be allowed to grab his tunes. Some servers are even more discriminating: The sysop might only be interested in a specific genre of music, so if Jimmy wants to deal with him, he'll have to e-mail or ICQ the MP3 pusher, discuss a trading arrangement, and hope that the pusher grants him a password. Still other FTP servers will provide visitors with a free password, but to get it, potential patrons must follow tedious


Audiogalaxy Search Results - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security Stop
Bookmarks Location: http://grape.audiogalaxy.com/search/search.php3
AltaVista Yahoo! Webopaedia TechEncyclopedi HR Maximum PC Clawmarks Intranet
Sitename: !-XiSeRS Industrial CompleX-!
98 % Chance of Being Open
IP Address Port Logon Password Last Checked Ratio Site Speed
209.98.212.89 21 mp3 tradeonly 12-15 at 02:52 CEN 1:4
FTP Client hot copy: ftp://mp3:tradeonly@209.98.212.89:21
How do I use this?
/x:/mp3hell/Tool - Opiate/
03 - Part Of Me - Tool Opiate.mp3 3942911 bytes
04 - Cold and Ugly (live) - Tool Opiate.mp3 4988833 bytes
05 - Jerk-Off (live) - Tool Opiate.mp3 5294061 bytes
06 - Opiate - Tool Opiate.mp3 10178435 bytes
/x:/mp3hell/_New Stuff_/Babyland/
Babyland - Motor Tool Appliance.mp3 3158754 bytes
Sitename: Rob's WarFTP Server
40 % Chance of Being Open
IP Address Port Logon Password Last Checked Ratio Site Speed
24.9.54.85 21 mp3 mp3 12-15 at 02:49 CEN 1:3
FTP Client hot copy: ftp://mp3:mp3@24.9.54.85:21
How do I use this?
/h:/mp3/Rock - Alternative/
Tool - Sober (Live).mp3 4911520 bytes
Document: Done

AudioGalaxy's FTP search engine reports site speed, chances of being open, passwords, and even ratio specifics. Copy the IP address into your FTP client, and you're on your way. Could MP3 **distribution be made any easier?**



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instructions that have them visiting a seedy web site, and looking for the password in the text of a nested ad banner.

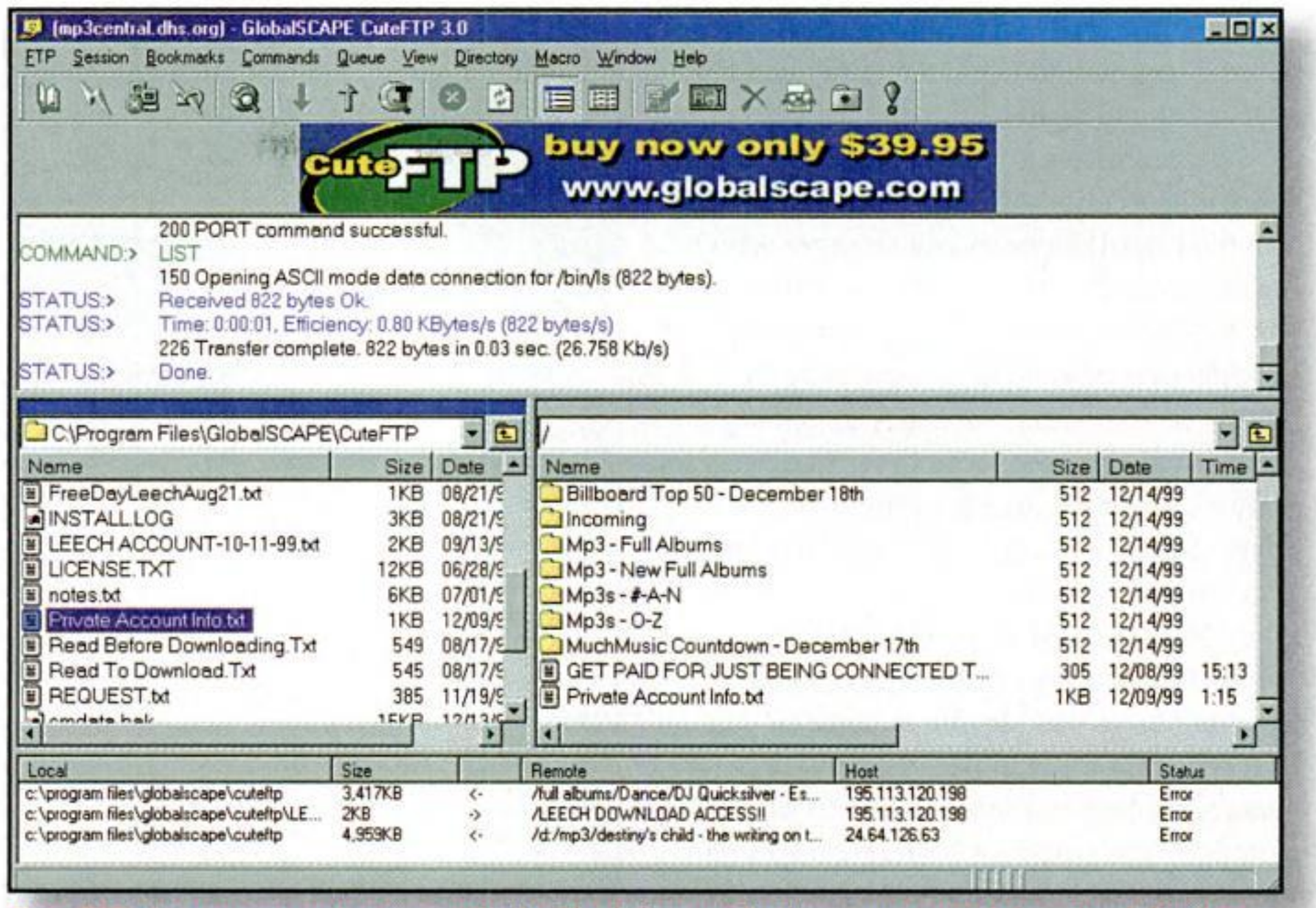
While extracting MP3s from FTP servers can be wearying, actually finding the music is relatively simple. CuteFTP has a built-in MP3 search function that combs through seven FTP search engines. *AudioGalaxy* (**www.audiogalaxy.com**) offers detailed server information for each song listing returned. *Argus* (**www.fuzzlogic.com/argus**) runs metasearches for not only MP3s, but other music-related content. Lycos's MP3 search engine (**http://mp3.lycos.com**) allows music snatchers to grab FTP files over a web interface (at least in theory).

When Jimmy types a song name into Lycos's engine, he'll receive a long list of links to matching files. The links are arranged according to their likelihood of availability. If Jimmy's lucky, he'll be able to click on a file link and download the MP3 like he would any other Internet content. In real practice, however, Jimmy might find that even files with high availability ratings are sitting on ratio servers, servers that have been turned off, or servers that are comically overwhelmed.

Fortunately, each link in a Lycos MP3 file list lets Jimmy "back-navigate" to the FTP server's root directory. When Jimmy touches the link to the root directory, he'll very likely get a description of the sysop's MP3 bartering policy, along with the server's actual IP address (e.g., 207.78.163.65). From here, he may have more success downloading the file via a dedicated client, such as *CuteFTP*.

Like Lycos, all the good FTP search engines report the numerical IP addresses to MP3 servers. All Jimmy has to do is fire up *CuteFTP*, hit Ctrl-F4 to bring up the QuickConnect menu, enter an IP address in the Host Address field, and hit OK. If he logs in successfully, he'll probably be greeted by a message explaining the server's access policy. If not, Jimmy can poke around in the server's root directory for a TXT file with a name like "Read to Download" or "Get Leech" (a leech is a temporary server account). The file will tell Jimmy how to get access to all the password-protected files that he can see on the server, but not touch.

FTP software like *CuteFTP* is extremely intuitive. Jimmy simply selects the file he wants to transfer and hits the download command; the file will save to a designated directory on his hard drive.


(mp3central.dhs.org) - GlobalSCAPE CuteFTP 3.0
FTP Session Bookmarks Commands Queue View Directory Macro Window Help
CuteFTP buy now only $39.95 www.globalscape.com
COMMAND:> 200 PORT command successful.
COMMAND:> LIST
150 Opening ASCII mode data connection for /bin/ls (822 bytes).
STATUS:> Received 822 bytes Ok.
STATUS:> Time: 0:00:01, Efficiency: 0.80 KBytes/s (822 bytes/s)
226 Transfer complete. 822 bytes in 0.03 sec. (26.758 Kb/s)
STATUS:> Done.
C:\Program Files\GlobalSCAPE\CuteFTP
/
Name Size Date
FreeDayLeechAug21.txt 1KB 08/21/9
INSTALL.LOG 3KB 08/21/9
LEECH ACCOUNT-10-11-99.txt 2KB 09/13/9
LICENSE.TXT 12KB 06/28/9
notes.txt 6KB 07/01/9
Private Account Info.txt 1KB 12/09/9
Read Before Downloading.Txt 549 08/17/9
Read To Download.Txt 545 08/17/9
REQUEST.txt 385 11/19/9
Name Size Date Time
Billboard Top 50 - December 18th 512 12/14/99
Incoming 512 12/14/99
Mp3 - Full Albums 512 12/14/99
Mp3 - New Full Albums 512 12/14/99
Mp3s - #-A-N 512 12/14/99
Mp3s - O-Z 512 12/14/99
MuchMusic Countdown - December 17th 512 12/14/99
GET PAID FOR JUST BEING CONNECTED T... 305 12/08/99 15:13
Private Account Info.txt 1KB 12/09/99 1:15
Local Size Remote Host Status
c:\program files\globalscape\cuteftp 3,417KB <- /full albums/Dance/DJ Quicksilver - Es... 195.113.120.198 Error
c:\program files\globalscape\cuteftp\LE... 2KB -> /LEECH DOWNLOAD ACCESS!! 195.113.120.198 Error
c:\program files\globalscape\cuteftp 4,959KB <- /d:/mp3/destiny's child - the writing on t... 24.64.126.63 Error

Cute FTP's top pane reports server activity. The left pane displays your current download directory. **The right pane displays the remote server's directory structure. The file in there marked "Private Account info" describes access procedures.**

Grabbing MP3s off of FTP servers does have its benefits over newsgroup filching: Jimmy doesn't have to deal with Usenet spam, he doesn't have to deal with incomplete song postings, and he can often find multi-gigabyte collections of music. But it is a relative hassle, and Jimmy will often have to upload MP3s as well, which may make him a distributor of illicit MP3s—which is exactly the type of trouble a young fella should strive to avoid.

Napster searching

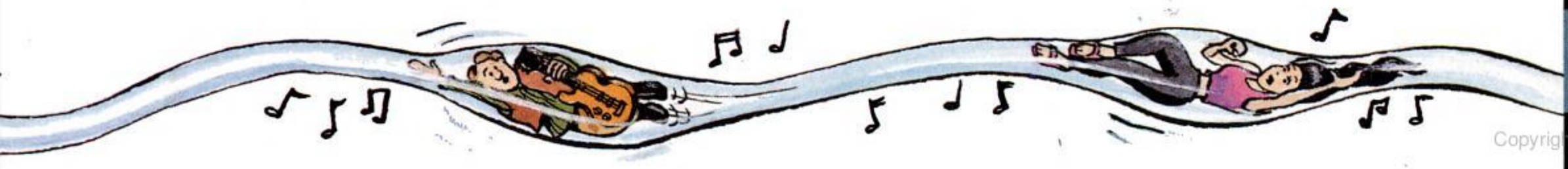
Napster (**www.napster.com**) is simultaneously exhilarating and terrifying. When Jimmy installs this canny little app on his PC, he immediately becomes a member of a global network of MP3 traders. Strangers can download files from his hard drive's designated MP3 directory, and he can download files from their designated directories. The trades occur over HTTP, not FTP, so when Jimmy finds a file via the *Napster* search interface, it's his for the taking, with no wheelin'-dealin' strings attached.

Even better, *Napster*'s search reports describe each file's size, recording quality, and connection speed, so Jimmy can opt to download only 160kbps bitrate files from people who are connected to a T3 network. Using *Napster* is the easiest, fastest way to build an MP3 collection. At any given time, more than 700GB of songs may be available for plucking.

Sounds to good to be true, right? Indeed. Not surprisingly, Napster Inc. is being sued by the Recording Industry Association of America for "contributory and vicarious copyright infringement." Nonetheless, at press time, *Napster* servers were still up and running, helping its "community members" trade files, and processing information on the contents of member hard drives.

It's important to note that *Napster* servers don't host the actual MP3 files, nor does Napster Inc. monitor each user transaction to determine whether pirated files are being distributed. But Napster Inc. does have the technical ability to log the IP activity of each and every user transaction; that is, who downloaded what file name at what time. If such user logs exist—and one might assume they do exist in this age of online consumer profiling—they could be of great interest to RIAA lawyers. Imagine: The RIAA could subpoena the activity logs of the entire *Napster* user base, and throw a legal blanket over the whole lot of 'em.

This is a paranoid, worst-case scenario, and we should note that in a September 1999 interview with *Maximum PC*, RIAA President Hilary Rosen said, "I have strong views about privacy, so I'm not going to start [targeting individual collectors]." Still, incurring the wrath of the RIAA is on the mind of every *Napster* user *Maximum PC* has ever met. For what it's worth, Napster Inc. CEO Eileen Richardson told us, "We



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don't know much of anything about our users," but would not directly say whether her company keeps logs of IP activity.

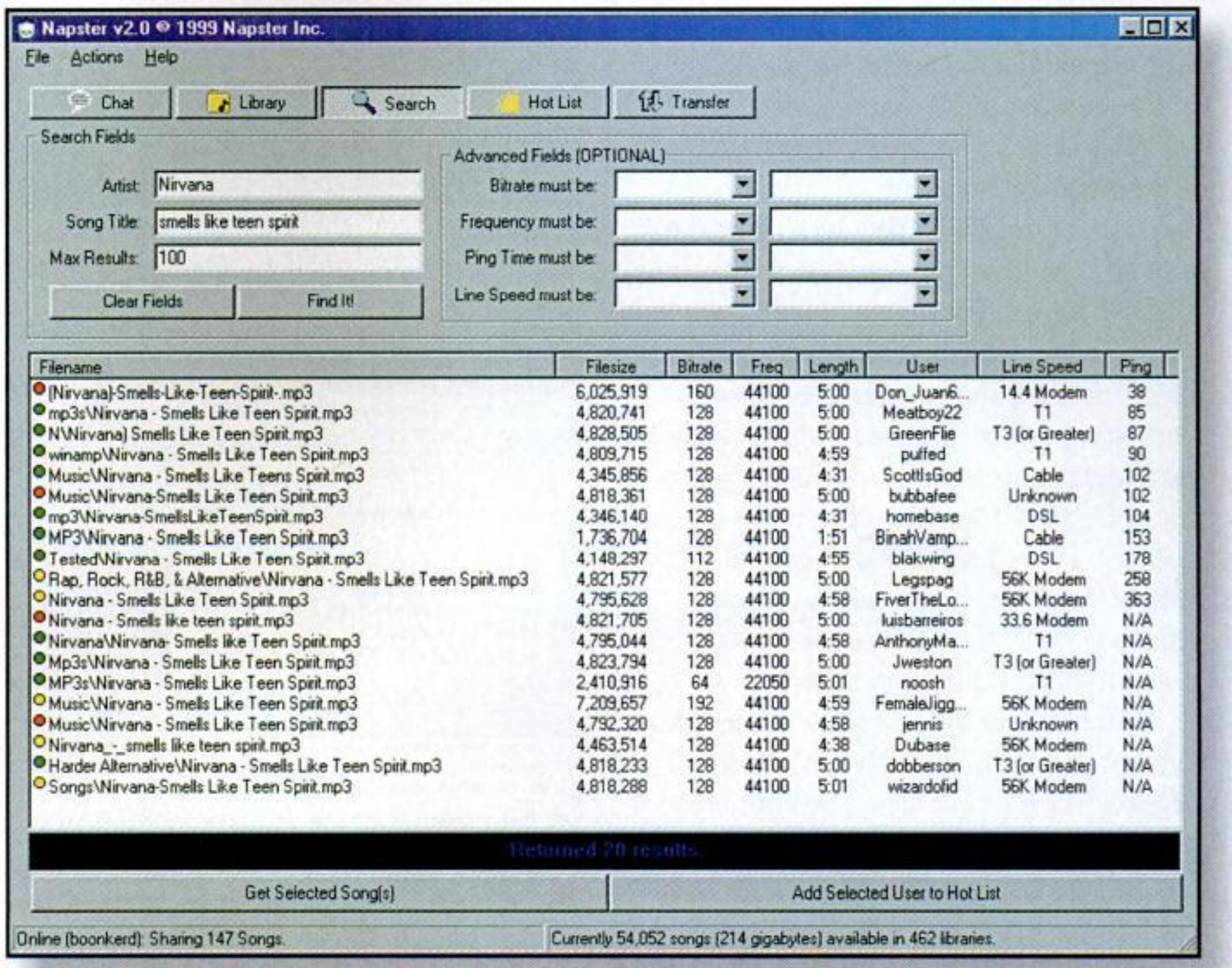
Napster users are also concerned about personal security. After all, they're opening up their hard drives to any stranger who wants to waltz on in. Users report that it's extremely disconcerting to be in the middle of a download session, only to discover that someone else is uploading content at the very same time. And if other users have access to the upload directory that you designate the first time you launch *Napster*, how far away are they from the rest of your hard drive?

Richardson says *Napster*'s core development team includes three security experts, and the app (which is still in beta) was built, first and foremost, with security in mind. The software is designed to grant access to your designated upload directory, and nothing else. We should also note that once you shut *Napster* down completely, other users can't download from your machine (just remember to also shut down *Napster* in your System Tray, where it resides even after you've shut down the client proper).

Richardson could not tell *Maximum PC* whether the client software has a "change root" command that would redefine your MP3 upload directory as your PC's root directory, and therefore make it impossible for a hacker to back-navigate to more precious content.

As of mid-December, no security holes had been reported in the *Napster* client. Richardson says Napster Inc. has no plans to release the client or server software to the open-source community. This is good news, because any lone-wolf developer with the ability to tweak the client source code could also write in a secret security hole. For now, *Napster* denizens live day-to-day, waiting for the RIAA to shut down the *Napster* servers, or for someone to report a security breech.

The *Napster* software is so intuitive, it requires no explanation here. But if you use it, remember that any file you download from another user might be pirated. And if another user downloads a pirated file from your machine—surprise!—you've just become an illegal music distributor.


Napster v2.0 © 1999 Napster Inc.
File Actions Help
Chat Library Search Hot List Transfer
Search Fields
Artist: Nirvana
Song Title: smells like teen spirit
Max Results: 100
Clear Fields Find It!
Advanced Fields (OPTIONAL)
Bitrate must be:
Frequency must be:
Ping Time must be:
Line Speed must be:
Filename | Filesize | Bitrate | Freq | Length | User | Line Speed | Ping
(Nirvana)-Smells-Like-Teen-Spirit-.mp3 | 6,025,919 | 160 | 44100 | 5:00 | Don_Juan6... | 14.4 Modem | 38
mp3s\Nirvana - Smells Like Teen Spirit.mp3 | 4,820,741 | 128 | 44100 | 5:00 | Meatboy22 | T1 | 85
N\Nirvana) Smells Like Teen Spirit.mp3 | 4,828,505 | 128 | 44100 | 5:00 | GreenFlie | T3 (or Greater) | 87
winamp\Nirvana - Smells Like Teen Spirit.mp3 | 4,809,715 | 128 | 44100 | 4:59 | puffed | T1 | 90
Music\Nirvana - Smells Like Teens Spirit.mp3 | 4,345,856 | 128 | 44100 | 4:31 | ScottIsGod | Cable | 102
Music\Nirvana-Smells Like Teen Spirit.mp3 | 4,818,361 | 128 | 44100 | 5:00 | bubbafee | Unknown | 102
mp3\Nirvana-SmellsLikeTeenSpirit.mp3 | 4,346,140 | 128 | 44100 | 4:31 | homebase | DSL | 104
MP3\Nirvana - Smells Like Teen Spirit.mp3 | 1,736,704 | 128 | 44100 | 1:51 | BinahVamp... | Cable | 153
Tested\Nirvana - Smells Like Teen Spirit.mp3 | 4,148,297 | 112 | 44100 | 4:55 | blakwing | DSL | 178
Rap, Rock, R&B, & Alternative\Nirvana - Smells Like Teen Spirit.mp3 | 4,821,577 | 128 | 44100 | 5:00 | Legspag | 56K Modem | 258
Nirvana - Smells Like Teen Spirit.mp3 | 4,795,628 | 128 | 44100 | 4:58 | FiverTheLo... | 56K Modem | 363
Nirvana - Smells like teen spirit.mp3 | 4,821,705 | 128 | 44100 | 5:00 | luisbarreiros | 33.6 Modem | N/A
Nirvana\Nirvana- Smells like Teen Spirit.mp3 | 4,795,044 | 128 | 44100 | 4:58 | AnthonyMa... | T1 | N/A
Mp3s\Nirvana - Smells Like Teen Spirit.mp3 | 4,823,794 | 128 | 44100 | 5:00 | Jweston | T3 (or Greater) | N/A
MP3s\Nirvana - Smells Like Teen Spirit.mp3 | 2,410,916 | 64 | 22050 | 5:01 | noosh | T1 | N/A
Music\Nirvana - Smells Like Teen Spirit.mp3 | 7,209,657 | 192 | 44100 | 4:59 | FemaleJigg... | 56K Modem | N/A
Music\Nirvana - Smells Like Teen Spirit.mp3 | 4,792,320 | 128 | 44100 | 4:58 | jennis | Unknown | N/A
Nirvana_-_smells like teen spirit.mp3 | 4,463,514 | 128 | 44100 | 4:38 | Dubase | 56K Modem | N/A
Harder Alternative\Nirvana - Smells Like Teen Spirit.mp3 | 4,818,233 | 128 | 44100 | 5:00 | dobberson | T3 (or Greater) | N/A
Songs\Nirvana-Smells Like Teen Spirit.mp3 | 4,818,288 | 128 | 44100 | 5:01 | wizardofid | 56K Modem | N/A
Returned 20 results.
Get Selected Song(s)
Add Selected User to Hot List
Online (boonkerd): Sharing 147 Songs.
Currently 54,052 songs (214 gigabytes) available in 462 libraries.

Napster lets your refine your MP3 searching according to file quality, ping time, and line speed. The colored dots next to song names denote the connection speeds of users. As opposed to songs listed in FTP search reports, all songs in a *Napster* report are ripe for the plucking.

THE ROGUE LAWYER: MP3 LEGAL LOWDOWN

Last July, a federal appeals court ruled against the RIAA in the case of the Diamond Rio MP3 player. Since then, the RIAA has been out for blood—working with law enforcement to issue "information subpoenas" that force ISPs to identify those posting pirated MP3s, and using an automated web crawler that scours the net for illegal song files. So, how can you beat the heat and keep the Feds from putting a chokehold on you?

The problem is that some MP3s are legal and some aren't, and it may be impossible to know if a certain MP3 is legal when you click the "Save" button. Although most FTP sites tack up a token disclaimer about copyright laws, these provide the safety of a JFK Jr. flight plan. MP3 legality boils down to this: An MP3 is legal as long as the song's copyright holder has granted permission to make the song available. Anything else is illegal.

Scott Joseph Driza—a *Maximum PC* fanatic and licensed Illinois attorney who specializes in technology law—explains the legality of MP3s.

Although it's possible to trace the IP address that downloads an illegal MP3, tracking down every person responsible for downloading a file would be like tracking teenagers who click the "LET ME IN—I'M OVER 18" buttons on porn sites. Even if you're a paranoid, Unabomber type, remember that every IP address doesn't necessarily have a person attached to it (think university computer labs and local libraries).

Bottom line: Can you get in trouble for downloading and listening to illegal MP3s culled from FTP servers and Usenet? The actual downloading of a file is not illegal; it's what you do with it afterwards that can cause you problems. Trading, distributing, or playing the file in public could have you making small rocks out of big rocks. But as far as prosecutors are concerned, listening to illegal MP3s in the privacy of your own home ranks right up there with pulling off mattress tags.

Ripping MP3s from a CD for personal use is legit. However, ripping MP3s and then trading them, or making MP3s available for download at a public site, is grounds for a visit to the pokey (unless you have permission from the copyright holder). If you violate any of these laws, you may be subject to fines of up to $250,000 and three years imprisonment for each offense (see page 43 for the story of an MP3 pirate who copped a plea).

Bottom line: Can you get in trouble for distributing illegal MP3s via an FTP server or Usenet newsgroups? Was Pamela Anderson more talented before her breast reduction? Distributing illegal MP3s can get you in all sorts of trouble, legal and otherwise. You could take a hit from just about anyone, including your ISP, your university, and even your employer. Forget the holiday spirit: When it comes to MP3s, it is better to receive.

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Anytime:

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Something bugging your computer? With over 90 antivirus titles, Beyond.com's Antivirus Center is the best medicine out there. What's more, Beyond.com offers 1.6 million digital products, everything from desktop publishing to video editing to productivity software, many of them downloadable. Shop online with Visa—just what the doctor ordered.

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KANE IS DEAD

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PLAYING WITH REAL

BRYAN DEL RIZZO SHOWS YOU HOW TO TURN YOUR PC INTO A CASH MACHINE THROUGH ONLINE INVESTING

OK, I admit it: I want to be a millionaire. You probably do, too. But since being an editor at *Maximum PC* doesn't necessarily put you in league with The Donald, I had to find another way to earn the big bucks—and fast. Since I couldn't get past the qualifying round for Regis's little TV show, I figured a quick jaunt into the world of online stock trading would be my next best bet.

On the pretense that I would write a feature explaining the nuances of investing online—and knowing that my own personal bank account was severely depleted by the purchase of a new house—I approached Jon Phillips, our reckless editor-in-chief, and asked him for some real money to play with.

After checking with our company president, Philly agreed to lend me $7,500. He had high hopes that I would make enough money to fly the *Maximum PC* staff to the French Riviera for a weekend of booze, gambling, and debauchery. My goal, however, was more succinct: Get in, get out, and get all the money.

Unfortunately, after a brief foray, I quickly realized that online trading isn't as simple as it looks. So, before you tie up all of your hard-earned ducats in pork-belly futures, read this guide and familiarize yourself with the conventions of online trading. I'll show you how to choose the right broker, walk you through the start-up steps, and review four of the most popular services.

Of course, you'll need a sound investment strategy if you're going to strike it rich, but as this article was going to press, the U.S. stock exchanges were still zealously rallying around a bull market. The U.S. economy has never, ever been stronger, and you, yes you, really can make big money through stock trading. By making your own trades directly via a web interface, you escape paying significant brokerage fees—which means more money accruing on your own bottom line. *Maximum PC* would never advocate day-trading (it's a loser's game), but if you think you can spot a smart long-term investment, you'd do well to make the trade yourself. Here's how...

WHERE TO BEGIN?

So, what is the basic regimen of online trading? Essentially, you go online, buy and sell stocks according to your own informed intuition, and are charged a standard fee for each trade you make. You can benefit from the immediacy of a realtime web interface—which is crucial for receiving up-to-date stock quotes and unloading duds in the middle of a downward spiral—and get to cut out the middleman of a traditional brokerage firm.

But before you play with your money, you'd better figure out exactly what it is you want to achieve. For starters, are you interested in long-term growth that pays off in modest gains, or would you rather risk it all in hopes of making lots of money over a shorter period of time? Unlike a full-service brokerage house—whose agents always find a way to charge you for every service they perform—the web is rife with free resources and information. It's the perfect place to gather your wits while you educate yourself about general investment practices and explore sites that guide you through the myriad financial terms that you'll stumble across. Remember: An informed consumer is a smart consumer.

And, whether you realize it or not, new investors like me and you aren't of much interest to

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MONEY

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traditional brokers. The reason? We don't have enough money to keep them motivated. Full brokers command high commission rates that can run upwards of hundreds of dollars, and may try to peddle off bad stock inventory on witless newbies.

SELECTING YOUR ONLINE BROKER

Choosing the right online service shouldn't be taken lightly. What happens if the site goes down? Can you make the same trade over the phone? Playing the market is a risky business, and not all services are created equal. Check around. If you're comfortable doing all your business over the Internet, then E*TRADE—which also offers online banking, home mortgages, and life insurance—may be your best bet. If you don't like playing solo and prefer a company that can also provide service through a branch office, you'd better check to see where those branches are located, and whether any are actually near you.

After some initial research, I decided to invest our money with E*TRADE, Schwab, Waterhouse, and Discover Brokerage. See my reviews on page 61 to get schooled on the differences between the four services, and to find out how wildly site features can vary.

SECURITY

This is a no-brainer. If the online brokerage doesn't offer encrypted transactions, take your money somewhere else.

FEES

Fees vary from service to service. If in doubt, ask. Some online brokers charge more for making trades on NASDAQ than on NYSE; others don't. You may also get dinged for extra commissions if you trade in heavy volume (usually more than 5,000 shares at a time). Don't be swayed by services that simply offer the lowest commission rates. They may be cutting corners elsewhere—in customer service, for example—to justify the low commissions.

REALTIME QUOTES

Not all sites offer realtime price quotes. Some, like Schwab, even limit the number of realtime quotes you can receive. There's nothing worse than making a trade and discovering that the quote you're looking at is 20 minutes old. A lot can happen in 20 minutes, and you don't want to be caught napping at the keyboard.

IPOS

Participating in an IPO creates visions of grandeur, but guess what? Not all brokerages get 'em, and even if they do, only "qualified" customers will actually get to play. It's kind of like a nightclub, except that instead of the doorman looking for people with nice clothes and good looks, brokerage firms look at your asset levels and the level of activity in your account. Bottom line: Learn each service's IPO policy.

OPENING BALANCES

You can't trade online without making some sort of initial deposit. Most of you will have to write a check and mail it in before you get access to your online account. The amount you have to pony up depends on the service. The absolute minimum to open any account is $1,000. I thought we could use a credit card to make the opening deposit. I was wrong.

CUSTOMER SERVICE

This is by far the most important factor to consider. Is phone support offered 24 hours a day, seven days a week? Is it toll-free? What happens if you get a server error when making a trade? To test overall responsiveness, I called each of our brokers once a day, at different times each day (including off-hours), to see how long it would take to speak with a live human being. On-hold times ranged from excellent (less than one minute for a Waterhouse rep) to dog-slow (more than 22 minutes to get our password reset at Schwab).

THE MILLION DOLLAR QUESTION

Online trading can be a lot of fun, but it's still hard work. Once you overcome your initial anxieties about playing with real money, you'll quickly get into the spirit of the game and groove to the beat of the markets. When your stocks go up, you'll experience an adrenaline rush. But when the market drops, you'll consider the absurdity of it all, and second-guess all your investing decisions.

Unfortunately, companies such as E*TRADE and Discover Brokerage have done regular Joes like you and me a disservice by portraying themselves, through exaggerated advertising, as a financial sure thing. If you have only $1,000 to invest, you'll soon discover that there's very little stock you can buy, as much of your money will be eaten up in trade commissions. Remember, you pay for each transaction, so a $15 fee on a $100 trade will feel like a much bigger hit than a $15 fee on a $10,000 trade. Investing in a 401K, CD, or mutual fund may be a better place for you to put your money.

And, yes, that's our final answer.

CONTINUED ON PAGE 58

TRADING TERMS

You've finally made it online and are psyched to make your first trade. The phrases "buy" and "sell" are self-explanatory, but you may not know some of the other terms in the trading lexicon:

▶ **Sell short** Investors use this strategy when they believe a stock's price will decline. You essentially borrow the stock from your broker, then sell it on the market. When the stock's price dips, you actually buy the stock, hand it over to the broker, and profit from the difference between the purchase price and sale price. This strategy can backfire if a stock's price rises.

▶ **Buy to cover** This is the order you use when you want to close out a short sale.

▶ **Market order** When placing a market order, the price at which the trade is made will be determined by the going rate—the best price—on the market. In other words, you're willing to accept the price, no matter what it is, in order to buy or sell the shares. However, because the stock market fluctuates, you won't actually know the price of the trade until after the trade is executed.

▶ **Limit** ...as in, to limit the amount you are willing to pay for a stock, or the amount you are willing to accept to sell a stock. If the stock never reaches your limit price, your order won't execute.

▶ **Stop/Stop Limit** For stop orders or stop limit orders, you dictate the maximum cost of the share price. If the stop order isn't executed by the time it reaches the predefined maximum, it becomes a market order, which can be executed at the best price available.

▶ **All or none** When you bid to buy or sell a certain number of shares, you can dictate that if the entire order isn't bought or sold in a group, you'll choose not to buy or sell any at all. For example, you might bid to purchase 300 shares of IBM, but dictate that no trade will be executed unless you can purchase all 300 shares at the same price simultaneously.

▶ **Good for day** You can place bids that are good for an entire day of trading. For example, if you bid to buy 300 shares of a certain stock at $25 per share, your bid remains open until the order is filled or until the market is closed for the day. If the trade isn't executed by the day's close of business, the bid is discarded. If you enter a "good for day" bid after hours, the bid will be active for the next trading day only.

▶ **Option trading** If you work for a company that's already public, you can buy and sell your vested shares, at the price they were granted to you, online. To facilitate this and reduce the paperwork required, companies may set up online accounts for their employees.

▶ **Margin account** ...allows you to increase your purchasing power by borrowing against the value of your stocks. However, executed margin trades must be covered by a sufficient supply of stock or cash. Margin accounts are necessary if you're planning on selling short.

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Female Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR
35	$ 280	$ 320	$ 465	$ 580	$ 660
40	$ 310	$ 450	$ 590	$ 770	$ 860
45	$ 560	$ 700	$ 860	$ 1,100	$ 1,320
50	$ 860	$ 1,050	$ 1,295	$ 1,560	$ 1,755
55	$1,280	$ 1,480	$ 2,035	$ 3,130	$ 3,850
60	$1,830	$ 2,250	$ 3,195	$ 8,330	$ 9,420
65	$2,920	$ 3,670	$ 5,855	$15,420	$ 15,420
70	$5,110	$ 6,220	$11,700	$29,340	$ 29,340
75	$8,920	$19,375	$23,100	$41,580	$ 49,680

Male Premiums

Age	10 YEAR	15 YEAR	20 YEAR	25 YEAR	30 YEAR
35	$ 325	$ 400	$ 545	$ 740	$ 885
40	$ 410	$ 550	$ 720	$ 970	$ 1,130
45	$ 740	$ 1,020	$ 1,112	$ 1,650	$ 1,930
50	$ 1,235	$ 1,665	$ 1,677	$ 2,550	$ 3,080
55	$ 1,880	$ 2,550	$ 2,940	$ 6,290	$ 9,095
60	$ 2,985	$ 3,830	$ 5,100	$14,340	$14,340
65	$ 5,155	$ 6,470	$ 9,885	$20,820	$20,820
70	$ 9,335	$11,715	$19,260	$34,980	$34,980
75	$17,420	$29,665	$38,220	$52,860	$60,120

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SETTING UP YOUR ONLINE ACCOUNT

Before you can start making your millions, you'll have to navigate through a seemingly never-ending onslaught of check boxes—most containing monetary lingo you've never heard of before. And, even when you do finally complete the online application, you'll still have to wait, because no online institution will allow you to make trades until it has your John Hancock on file and your initial deposit in its bank account. To help guide you through the bewildering maze of options you'll encounter when opening an account, I thought a stroll through E*TRADE's application process might come in handy.

REGISTERING YOUR ACCOUNT

Who will have registered access to the account? If you're joined at the hip with your spouse, best friend, or Siamese twin, a joint account may be the option for you. But, unless you're in some special situation, you're probably going to open an individual account for yourself. Custodial accounts are for people starting a college fund for a newborn baby. Stay away from the retirement accounts unless you understand the tax and legal ramifications of 401Ks and IRAs.

My choice: "The world revolves around me!"

CHOOSING THE RIGHT ACCOUNT

This is where things begin to get sticky. With a "cash account" you'll have to supply an initial deposit (of cash), which you'll use to make all your trades. With a "margin account," you'll get a line of credit that you can use for purchasing stocks, overdraft protection, or taking out a personal loan. However, margin accounts have rotating interest rates and additional fees, and generally require a heftier initial balance. "Option accounts" are for people with vested shares in a particular company. They allow you to make stock trades at prices far below the going rate.

My choice: "I'll play with cold, hard Benjamins."

TRANSFERRING FUNDS

The most common way to fund your account is by writing a check and sending it via snail mail to the brokerage of your choice. If you're so inclined, you can transfer funds directly from your bank or mutual fund, or send in a stock certificate that will be converted into usable funds.

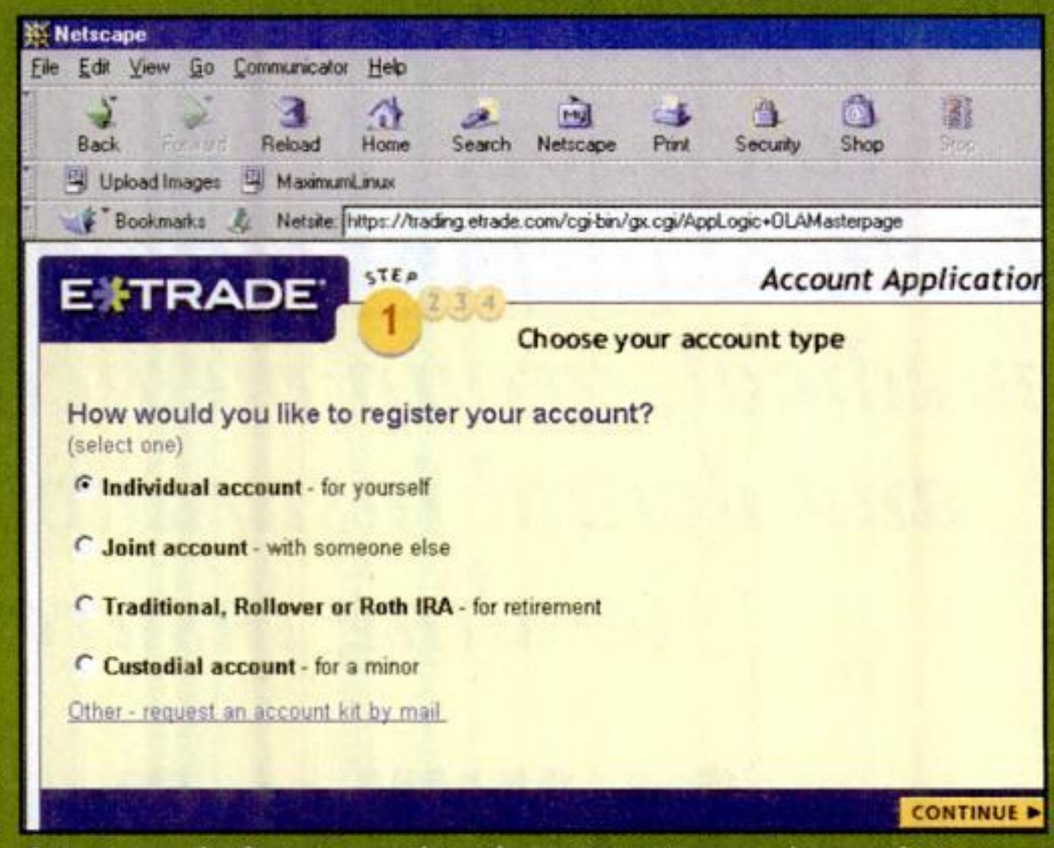
My choice: "I'll trust the USPS with my little checkaroony."

NAME, RANK, AND SERIAL NUMBER

Even if you elect to hand-write your application or enroll over the phone, you're going to have to divulge a wealth of personal information. Be prepared to provide telephone numbers, e-mail addresses, citizenship status, date of birth, and, for tax purposes, your social security number. You'll also be required to supply your current employment status, including your business address. However, as best as we can tell, nobody actually checks this information, or can deny your application based upon the data keyed in.

If you work for a registered broker, or if you're a director or policy-making officer of a publicly owned company, you'll have to jump through a couple more hoops before you can begin trading.

My choice: "I made stuff up!"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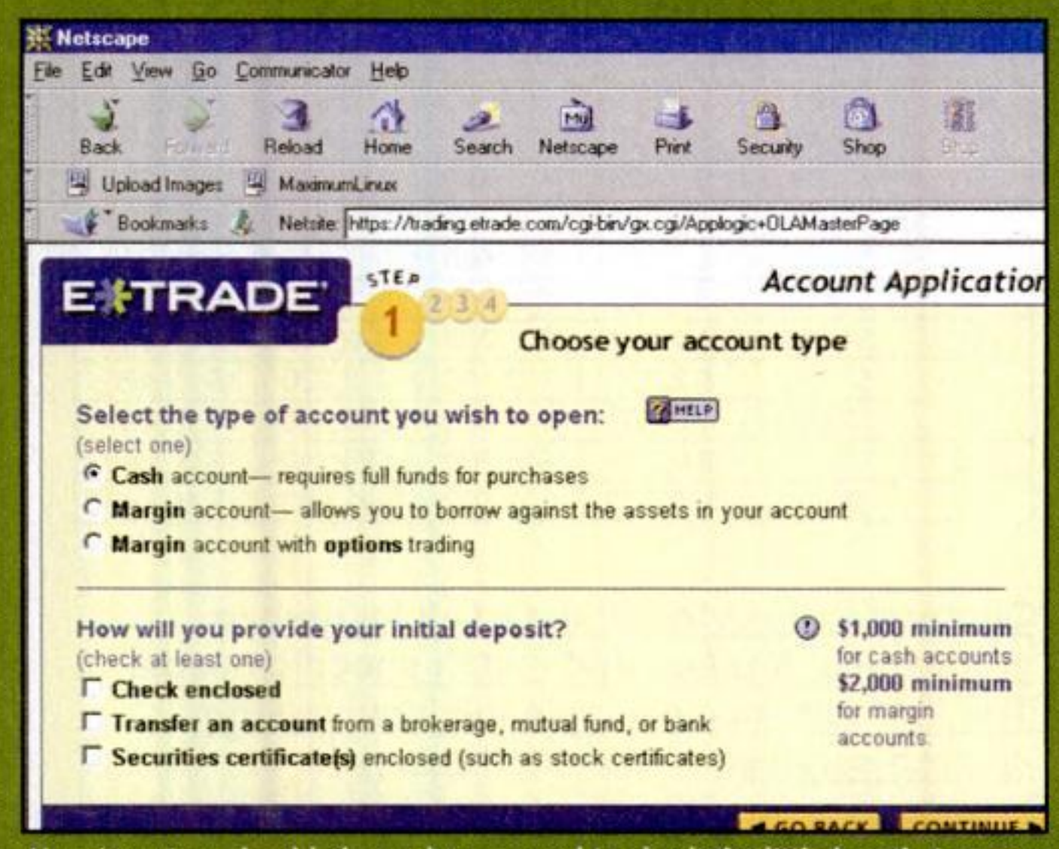
STEP 1 2 3 4
Account Application
Choose your account type
How would you like to register your account?
(select one)
Individual account - for yourself
Joint account - with someone else
Traditional, Rollover or Roth IRA - for retirement
Custodial account - for a minor
Other - request an account kit by mail
CONTINUE

Sometimes, the first step can be a doozy. In most cases, the very first decision you'll have to make is what sort of account you'll need to open. In the majority of the cases, you'll open an individual account for, you guessed it, yourself.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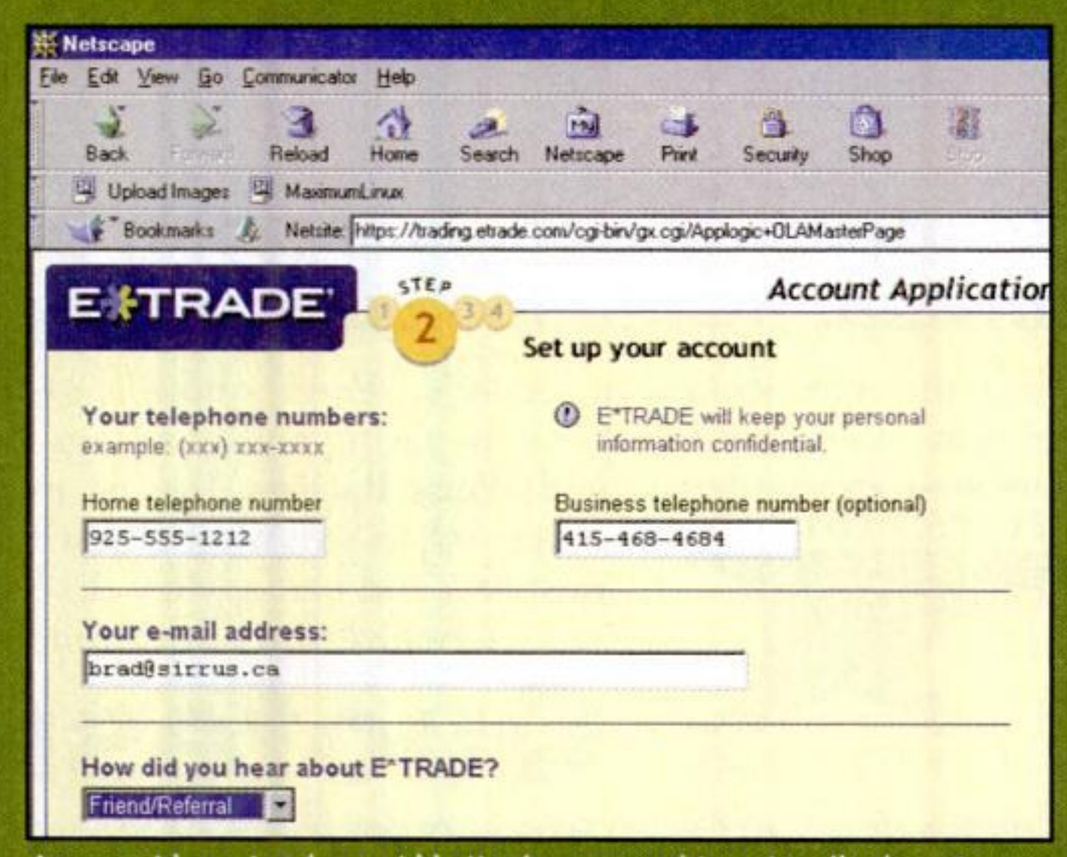
E*TRADE
STEP 1 2 3 4
Account Application
Choose your account type
Select the type of account you wish to open:
HELP
(select one)
Cash account— requires full funds for purchases
Margin account— allows you to borrow against the assets in your account
Margin account with options trading
How will you provide your initial deposit?
(check at least one)
$1,000 minimum for cash accounts
$2,000 minimum for margin accounts
Check enclosed
Transfer an account from a brokerage, mutual fund, or bank
Securities certificate(s) enclosed (such as stock certificates)
GO BACK
CONTINUE

New investors should always be prepared to check the little box that says "cash account." Margin trading can be tricky business, and if you don't have the money to back up your trades, you might be privy to a visit from "Uncle Louie."



As we said previously, you'd better be prepared to enter all relevant personal data. And don't try to fake it... Uncle Sam will find out and hunt you down like the dog you are.

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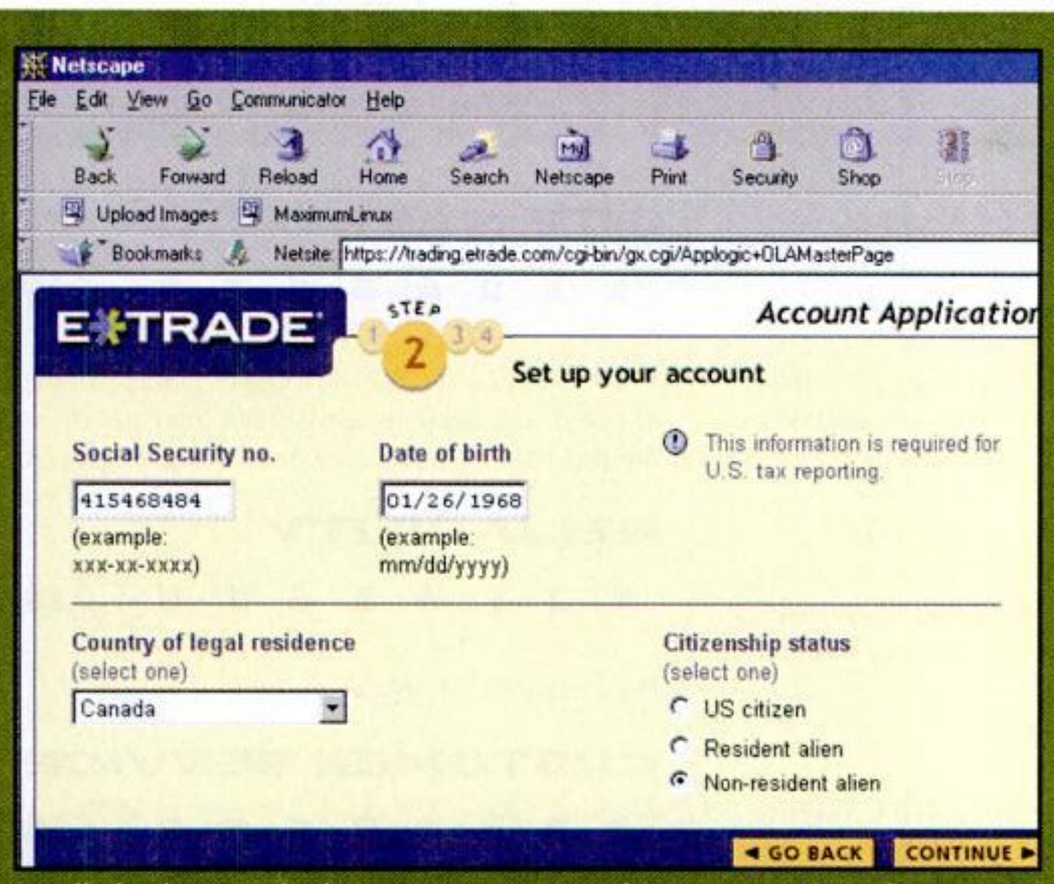
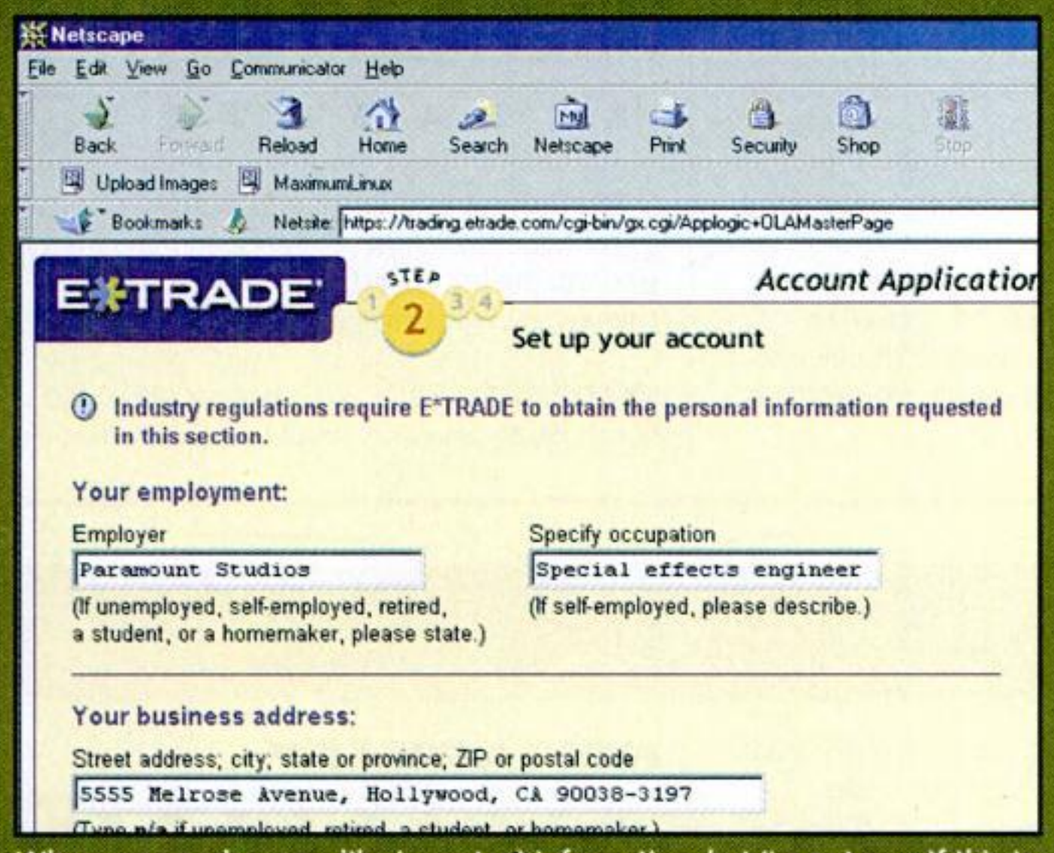


You'll also have to disclose your correct Social Security number. This is primarily for tax purposes. At the end of the year, you'll receive a statement of gains and losses, which you'll need when you're filing your tax return on April 15. Slacker!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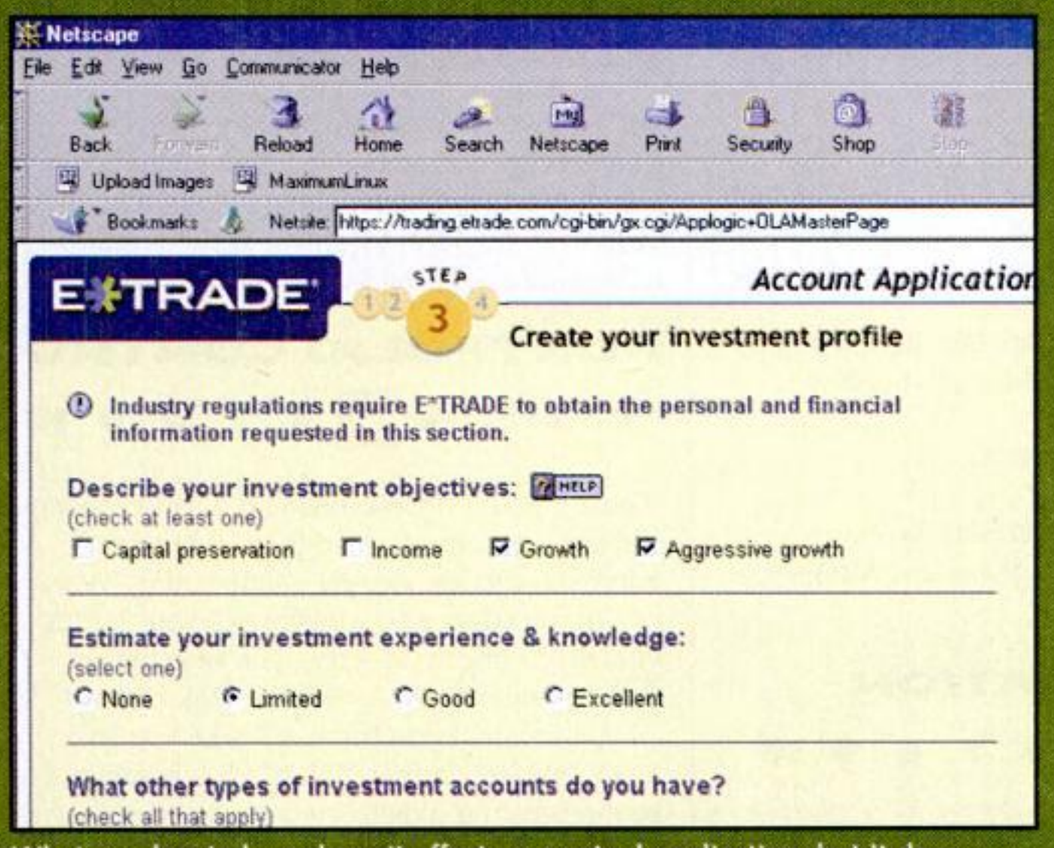
Upload Images MaximumLinux
Bookmarks Netsite: https://trading.etrade.com/cgi-bin/gx.cgi/Applogic+OLAMasterPage
E*TRADE
STEP 2
Account Application
Set up your account
Industry regulations require E*TRADE to obtain the personal information requested in this section.
Your employment:
Employer
Paramount Studios
(If unemployed, self-employed, retired, a student, or a homemaker, please state.)
Specify occupation
Special effects engineer
(If self-employed, please describe.)
Your business address:
Street address; city; state or province; ZIP or postal code
5555 Melrose Avenue, Hollywood, CA 90038-3197

Where you work seems like important information, but I'm not sure if this is remotely relevant or even enforceable. Still, it always pays to tell the truth. You'll also have to cough up whether you're a cog in a publicly-owned company.



What you key in here doesn't affect your actual application, but it does allow someone, somewhere, to track your hidden wants and desires. I'm guessing that this information is used for marketing purposes only.

CRUEL INTENTIONS

Thanks to "industry regulations," you'll also have to cough up information concerning your investment objectives, the level of your investment expertise, and investment accounts you already have. And no, your "still-in-their-original-packaging" *Star Wars* toys don't count as "investments."

You should choose "aggressive growth" when you intend to trade volatile securities that incur a greater level of risk. "Growth accounts" and "capital accounts" are more conservative in nature, and attempt to preserve as much of your original capital as possible. "Income accounts" are just that—an attempt to make enough to live on without actually having to hold a real job. Yeah, right.

My choice: "'Who wants to be a millionaire?' wasn't an option. I think it should be."

KEEPING YOUR CASH SECURE

When you're not making trades, you'll want to keep your cash in some sort of interest-bearing account. Actually, you'll be forced to, because most online institutions automatically transfer your funds to such an account if you have more than $100 sitting around collecting dust. Credit interest accounts pay money on all uninvested cash, but the interest rate isn't very high, and not much better, if any, than what the big banks offer.

Money market and mutual funds are better bets, as your money will be invested in short-term securities that can pay off with decent returns. If you can, choose a tax-exempt money market fund. Remember: Gains or losses from actual stock trades are still subject to Uncle Sam's tax whimsies. Pay up or pay the consequences.

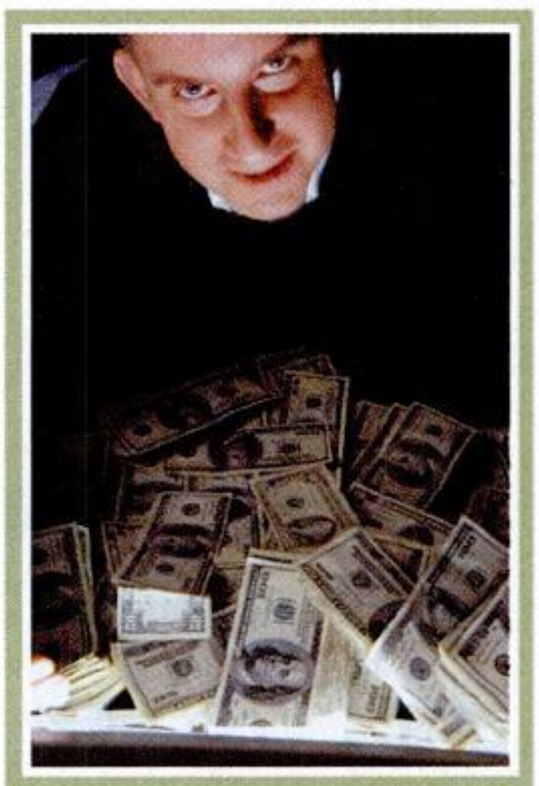
My choice: "I chose a California tax-exempt account. It's got to be safer than stuffing the dough in my mattress, right?"

REVIEWING YOUR WORK

When you've made it this far, the only thing left is to check your work and ensure everything you typed in is correct. You can also link to other existing accounts (if you're juggling more than one) and create a personalized log-in name and password.

After everything is finished online, you'll have to print out the application, write a check, and put the whole shebang in the mail. Within a week, you should receive a packet of information, including your account name and password. Depending on the service you select, you may have to phone a toll-free number in order to activate your online trading account.

Now let's take a look at four popular services.



DAY BY DAY

Compared to normal online investing (where you might go online a few times a week), day trading is very volatile. By definition, day traders hold stocks for a very short period of time, making multiple (sometimes hundreds of) trades of the same stock over a single day. Thanks to guys like Mark Barton, the Atlanta day trader who gunned down nine people before turning the gun on himself, day trading has now become synonymous with violence and mental instability. However, very few Americans are day traders. According to Schwab, less than 3 percent of its online investors—about 90,000 users—execute enough trades to be labeled day traders.

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E*TRADE.COM

URL www.etrade.com

HISTORY Bill Porter, a physicist and patent-owning inventor, founded E*TRADE in 1982. In early 1996, the official E*TRADE web site went live. It may not be the largest online brokerage, but extensive word of mouth ranks E*TRADE up there with the biggest boys.

NUMBER OF USERS/ACCOUNTS 1,500,000

OTHER SERVICES OFFERED Internet banking, (checking, savings, money market, CDs), retirement accounts, home mortgages, insurance (auto, life, home, health), E*TRADE VISA cards, holiday shopping, books (powered by Amazon.com).

OPENING INVESTMENT REQUIRED
$1,000 for cash accounts
$2,000 for margin accounts

TRADING COSTS $14.95 per trade for listed stocks; $19.95 for NASDAQ, limit, and stop orders. No additional charges to make trades by phone.

REALTIME QUOTES Yes; they're gratis for non-professional traders who sign a legal agreement. Professional traders who don't make 30 trades per calendar quarter must pay a fee.

OPTION TRADING Yes.

HIDDEN FEES You'll have to pay for account transfers, check photocopies, stop payments, account research, and opening an IRA. Trades involving more than 5,000 shares are subject to additional fees of one cent per share traded.

TRADE CONFIRMATIONS All confirmations are sent by e-mail and snail mail.

AFTER-HOURS TRADING Yes, from 4:05 p.m. to 6:30 p.m. EST for NASDAQ or NYSE stocks.

INCENTIVES TO SIGN UP $100 signing bonus, up to 50,000 United Airlines frequent-flyer miles.

UNEXPECTED SURPRISE We received a book of E*TRADE checks in the mail shortly after opening our account—and now we receive them every friggin' month.

SITE NAVIGATION

1 2 3 4 5 6 7 8 **9** 10

E*TRADE is by far the most user-friendly site we checked out. Sections are laid out intelligently and are divided into easily digested, bite-sized pieces.

RELIABILITY

1 2 3 4 5 6 7 8 **9** 10

We encountered only minor hiccups.

CUSTOMER SERVICE

1 2 3 4 5 6 7 8 **9** 10

We were impressed with the wealth of information E*TRADE offers; there's no assumption that you already know the ins and outs of online trading. Phone and e-mail support are offered.

PORTFOLIO CONTROL

1 2 3 4 5 6 7 8 9 **10**

E*TRADE displays account information in an easy-to-read grid that shows the price you bought the stock at, the last publicly traded price, the daily change, your gain/loss, and your total holdings.

SYNOPSIS E*TRADE is the hippest site of the bunch. Stuffy investors should go somewhere else.

MSDW.COM

URL www.msdw.com

HISTORY Discover Brokerage, a.k.a. Morgan Stanley Dean Witter, is a global financial services firm with offices around the world. We liked their TV ad with the tow-truck guy who owns an island.

NUMBER OF USERS/ACCOUNTS Undisclosed

OTHER SERVICES OFFERED Bond trading, wireless trading for Palm PDAs, 24-hour automated telephone quotes/trading.

OPENING INVESTMENT REQUIRED
$2,000 for cash or margin accounts

TRADING COSTS $29.95 per each online trade; $39.95 for brokerage-assisted phone trades.

REALTIME QUOTES Yes, at no charge.

OPTION TRADING Yes.

HIDDEN FEES Trades involving more than 5,000 shares are subject to additional fees of one cent per share traded.

TRADE CONFIRMATIONS All trades are confirmed by e-mail and snail mail. E-mails include only a reference number, and no information about the stock name or share price.

AFTER-HOURS TRADING Yes, from 4:30 p.m to 8:00 p.m. EST, Monday through Thursday.

INCENTIVES TO SIGN UP None.

UNEXPECTED SURPRISE Shortly after we signed up, Discover Brokerage became Morgan Stanley Dean Witter.

SITE NAVIGATION

1 2 3 **4** 5 6 7 8 9 10

The screen layouts are downright hostile to the trading newbie. Hyperlinks you think will take you to more detailed information are redundant, and simply re-load the current screen you're on. Argh!

RELIABILITY

1 2 3 4 5 6 7 8 9 **10**

We experienced no downtime or delays.

CUSTOMER SERVICE

1 2 3 4 5 **6** 7 8 9 10

For inexplicable reasons, customer service numbers are buried two levels deep in the sub-navigation menus. There's very little support in the form of online documentation or definitions. E-mail support is offered.

PORTFOLIO CONTROL

1 2 3 4 **5** 6 7 8 9 10

Viewing your portfolio online is a sad experience. Screens are nothing more than a series of numbers, and are visually uninteresting. Worse, you're forced to view a history of your trades in order to discern whether you're actually making any money. And, when you click on a hyperlink that you think will take you to a more detailed presentation of your holdings, you're taken to a help screen.

SYNOPSIS This is an ugly site that needs a major overhaul. Information isn't logically presented.

ILLUSTRATIONS BY MARK HARLIEN

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SCHWAB.COM

URL www.schwab.com

HISTORY Schwab, the nation's largest financial provider, is regularly ranked number one by leading financial institutions and magazines. To see how superior the company is, I had to supply the largest minimum opening balance of the services I tried.

NUMBER OF USERS/ACCOUNTS 3,000,000+

OTHER SERVICES OFFERED Estate accounts, trusts, IRAs, personalized research, automatic investment funds, corporate retirement plans, life insurance.

OPENING INVESTMENT REQUIRED $5,000 for cash or margin accounts; $2,500 if you sign up to deposit or invest $100 or more per month via Schwab's Automatic Investment Plan.

TRADING COSTS $29.95 per trade for up to 1,000 shares.

REALTIME QUOTES Yes, limited to what's in your "Quote Bank." Once you've exceeded 200 realtime quotes, you pay for each additional quote.

OPTION TRADING Yes.

HIDDEN FEES Trades involving more than 1,000 shares are subject to additional fees of three cents per share traded. There's a $29 annual fee if your account balance falls below $10,000.

TRADE CONFIRMATIONS All confirmations are sent via e-mail and snail mail.

AFTER-HOURS TRADING Yes, from 4:05 p.m. to 7:00 p.m. EST, Monday through Friday.

INCENTIVES TO SIGN UP $25 Amazon.com gift certificate.

UNEXPECTED SURPRISE Monthly statements contained a staggering amount of information; most of it will be completely foreign to novices.

SITE NAVIGATION

1 2 3 **4** 5 6 7 8 9 10

Schwab's site is a cluttered mess. It appears easily navigable, but its screens are filled with far too much secondary information.

RELIABILITY

1 2 3 4 5 6 7 **8** 9 10

We experienced two minor delays while accessing our accounts, both of which were server errors.

CUSTOMER SERVICE

1 2 3 4 5 **6** 7 8 9 10

Unlike Waterhouse.com, Schwab doesn't include quick-help links throughout its site. And once you do find the help screens (buried in the "service" tab), you'll find the information less than friendly.

PORTFOLIO CONTROL

1 2 3 4 5 **6** 7 8 9 10

The account information screens are filled to the brim with such information as market indices, urgent notices, and company-related news and information. In short, too much clutter makes our brains a-flutter.

SYNOPSIS You could spend your entire life researching the financial markets and still not feel completely comfortable browsing this site. But, then again, with minimum account balances of $5,000 (it was raised from $2,500 shortly after we joined), who among us can actually afford to join?

WATERHOUSE.COM

URL www.waterhouse.com

HISTORY Waterhouse has been around since the late 70s, and is consistently rated in the top three among brokerage firms in the country. Of the services we checked out, it has the best trade fees.

NUMBER OF USERS/ACCOUNTS 1,1600,000

OTHER SERVICES OFFERED E-banking, retirement accounts, mortgages, home equity line of credit, credit cards, ATM/debit cards.

OPENING INVESTMENT REQUIRED $1,000 for cash or margin accounts.

TRADING COSTS $12 per trade; no separate charge for NASDAQ or NYSE trades.

REALTIME QUOTES Yes.

OPTION TRADING Yes.

HIDDEN FEES Trades involving more than 5,000 shares are subject to additional fees of one cent per share traded. Phone trades are subject to a charge of $35 for up to 5,000 shares.

TRADE CONFIRMATIONS All confirmations are sent by e-mail and snail mail.

AFTER-HOURS TRADING Yes, but only NASDAQ-listed stocks from 4:30 p.m. to 7:00 p.m., Monday through Friday.

INCENTIVES TO SIGN UP 10,000 American Airlines frequent-flyer miles.

UNEXPECTED SURPRISE The investor kit included a wallet-sized account card that lists all the customer service numbers you'll ever need.

SITE NAVIGATION

1 2 3 4 5 6 7 8 **9** 10

The Waterhouse site is uncluttered, with pop-up tabs for easy navigation. Making trades is done via drop-down bars. As a bonus, you can view current stock quotes as you ponder the trade.

RELIABILITY

1 2 3 4 5 6 **7** 8 9 10

Though we didn't experience any major site meltdowns, it took a few extra seconds when we logged into the system to access our portfolio.

CUSTOMER SERVICE

1 2 3 4 5 6 7 8 **9** 10

The site includes an excellent compendium of online help services, including detailed definitions. Customer service numbers are easily located. E-mail support is provided, but phone support appears to be the primary mode of communication.

PORTFOLIO CONTROL

1 2 3 4 5 6 7 8 **9** 10

Nothing touches E*TRADE's elegance, but Waterhouse comes close. Asset allocations are broken down into distinct sub-menus, and are mercifully simple and easy to understand.

SYNOPSIS Waterhouse has the least expensive trading charges, and its overall web design and implementation are second only to E*TRADE.

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SO, HOW DID I DO?

How did I do? Well, considering that I didn't know beans about the stock market, or what companies I should invest in, not bad! After some initial research, I selected a nice mixture of technology and lifestyle stocks. I made bids and trades on all four services, each day, at roughly the same time. I also placed limit bids, which were ultimately ignored by stock sellers. For example, I offered to pay between $24 and $27 per share to own part of the World Wrestling Federation, but my multiple bids were rejected repeatedly. Ironically, the stock hit a high of $34 in late October, but took a tumble in early December, hitting a historic low of $16.25. Guess the trading gods were looking out for me all along!

Of course, the trick to playing the market is to know when to get in—and when to get out.

Notable movements in my portfolio included a stock split (yay!) for America Online; a major hike for E-Toys, which rose to $67 (and unfortunately fell down to $53 just as we went to press); and a nice jump for AMD, which hit $31.50, up from $19.

Among my biggest stress-inducers were Oracle, which dropped about six points immediately after I bought it (but thankfully rose steadily back into the black by the time I sold it); and Intel, whose COMDEX announcements did nothing to keep the stock valuation high. My biggest gain came care of Nokia, which rose more than $40 a share in the span of a few weeks! Unfortunately, since I only had enough money to buy a measly five shares, I'm still a long way off from my million dollar payoff. Sigh... back to the old grindstone for Chief Bagogo.

▶ TIPS OF THE TRADE

You'd better come prepared for everything—and anything—if you plan to survive the tumultuous world of online trading. Here's a handy list of dos and don'ts that'll ensure your exploration of this uncharted territory is more hit than miss.

DO... a lot of research. Before you sign up for any service, check out the site, and do a thorough walk-through to find out what services are available. Pay special attention to the customer support sections, so you'll know where to turn if you need help.

MY PORTFOLIO AT A GLANCE

STOCK	# OF SHARES	PURCHASE PRICE	SELLING PRICE	PROFIT/ LOSS
AOL	5 (10 after split)	$163.875	$80.00	-$19.38
Intel	2	$80.31	$78 11/16	-3.25
E-TOYS	10	$57	$53 3/16	-$38.12
Martha Stewart	5	$27	$30 1/16	+$15.31
MP3.com	5	$40.44	$39 7/8	-2.82
PetSmart.com	150	$4.63	$5	+$55.50
Oracle	2	$76.25	$78 11/16	+$4.88
Nokia	5	$131	$172	+$205
AMD	5	$26.25	$31.50	+$26.25
Corel	5	$16	$18	+$10
Grand Total				$253.37

DON'T... put all your eggs in one basket. Every financial advisor will tell you that diversification is the key to long-term success. Unless you're privy to some top-secret insider information—the use of which is illegal—you should never invest all your cash in a single stock. Diversifying your portfolio will ensure you never end up like one of those "poor-house guys" who has to wear a barrel for clothing.

DO... consult with financial advisors. They'll be able to explain the tax implications of trading, and can chart out a sound investment strategy for you.

RELATED LINKS

Online brokerages
Here's a list of the most popular online brokerages.

- **www.etrade.com**
- **www.waterhouse.com**
- **www.schwab.com**
- **www.msdw.com**
- **www.datek.com**
- **www.dljdirect.com**
- **www.ameritrade.com**
- **www.mrstock.com**
- **www.quicken.com**
- **www.fidelity.com**

Investing resources:
Here's a list of web sites that offer investing advice.

- **www.tradingacademy.com**
- **www.onlinetradinginc.com**
- **www.daytradingresource.com**
- **www.smartmoney.com**
- **www.money.com**
- **www.fortune.com**
- **www.worth.com**

Trading online can be fun, but if you're selling your Mom on e-Bay to cover a margin, you're in way over your head, and need to get out pronto.

DON'T... expect to become a millionaire overnight. Sure, you can probably make a tidy profit if you stick with stocks long enough, but the chances of you hitting the proverbial gold mine during a single quarter are practically zilch. Long-term investment and short-term losses are the true names of the game.

DO... read the prospectuses and financial statements before making a trade. You shouldn't go with your gut instinct when making a trade. You may love 3dfx's graphics cards, but a quick check of the company's financial history may make you think twice before plunking down money on 3dfx stock. In other words, you should be betting on a company's financial savvy, and not necessarily its product savvy.

DON'T... expect to be privy to new IPOs. Internet stocks are trading like wildfire these days, but new public offerings are usually reserved for employees and candidates who have been pre-selected based upon their trading volume and net worth (usually around $100,000).

DO... make sure that your brokerage firm allows phone and in-person trades. That way, if your Internet connection bites the big one just as you're trying to execute a trade, you've got other avenues to fall back on. The biggest firms even have branch offices that you can go visit. At the very least, you should drop in and introduce yourself. Heck, tell 'em *Maximum PC* sent ya.

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Building Sexy Text Animation With FLASH 4

Maximum PC's Geoffrey Visgilio gets gussied up Pamela Lee-style to help you perform cosmetic surgery on your web site

So, you've made your web site, and you think it's the prettiest little thing on the block. You're sure that all the time you spent editing pictures and designing frames will pay off with a billion click-throughs a day. Well, Spanky, here's a little wake-up call: Text matters. It's the backbone of any site's content, yet so few budding site designers pay it enough attention. The fact is, with today's animation tools, you can give your display type as much pizzazz as you give your images and basic design.

Sex sells, like it or not. So, why not spruce things up a bit? Let's grab some text, give it a full makeover, show it a night on the town, and see if we get lucky.

For these projects, we'll be using Macromedia's *Flash 4*, the best web animation and interactivity program we've played with. (A demo version is included on this month's Maximum CD.) *Flash* animation is vector-based, which means you can avoid the mongo file sizes of bitmapped images. Smaller file sizes, of course, help your site load much faster, so that even people with slow connections can enjoy their visits to your virtual pad (in other words, size *does* matter).

Flash files can be exported to the common GIF animation format, as well as the native *Flash* format in HTML that requires site visitors to have a *Flash* plug-in. Though GIF animations are immediately visible to all visitors, *Flash* files often load more quickly and support integrated sound, for extra pageantry.

Now, dust off the Barry White CDs, light some scented candles, and get ready to give your text the hot lovin' it so desperately needs.

(What does all of this have to do with the wig and makeup I'm wearing? Not much. Truth be told, I'm still being punished for last month's stalking shenanigans.)

STOP! *Before proceeding with these projects, take a look at the way they flow—visit the Re:print section of* ***www.maximumpc.com****. The screenshots here do not do the animation justice.*

PHOTOGRAPHY BY JACK HUTCHESON

For definitions of terminator words, hyperlink to the back of Maximum PC, or check out the Terminator online at www.maximumpc.com.

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Know Your Cosmetic Counter

You know the drill: It's time to take a look at the basic Flash interface. Feel free to experiment with more advanced tools that aren't mentioned here, if you want to get daring.

Toolbar This works like any standard toolbar for graphic apps. We're going to focus mainly on the text tool for these lessons.

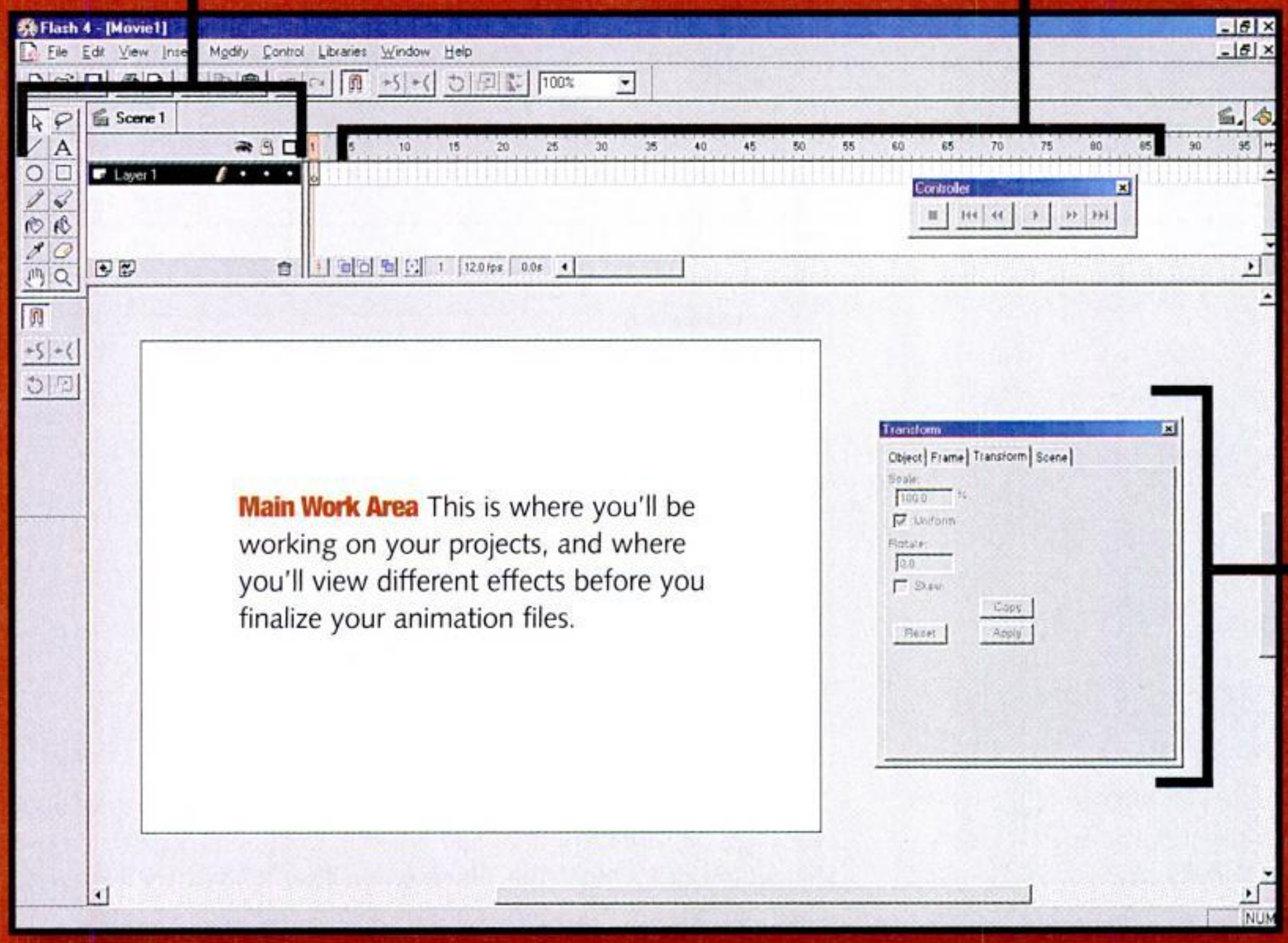
Layer Box This is where the layers of your animation appear in abstract, for convenient layer management. Layers are like sheets of transparent paper; you can draw on different layers, then combine them so that all the images superimpose upon one another.

- **Layer** Here you can see where a layer sits in its stacking order. You can double click to rename the layer.
- **Eye** Makes any given layer visible or invisible.
- **Padlock** Locks a layer so no alteration can be made to it.
- **Show All Layers as Outlines** Shows only a layer's outline.
- **Add Layer** Adds a new layer to the timeline.
- **Add Guide Layer** Adds a layer that can be used to guide animation, but won't appear in the finished movie.
- **Trashcan** Permanently deletes a selected layer.

Controller Much like the front panel on a VCR, the controller allows you to play your animation, forward, reverse, and skip to the beginning or the end of the frame sequence.

The Timeline This is where the elements of your animation are displayed in abstract. You'll see representations of each different layer and keyframe. Keyframes are the points at which specific actions occur in an animation. A keyframe is considered blank until you fill it with something.

- **Playhead** This plays all your animation frames, displaying the action of all your layers together.
- **Center Frame** Centers the playhead.
- **Onion Skin** Makes the frames of an animation appear on top of one another, so you can see what each movement looks like (much like using cells in cartoon animation).
- **Onion Skin Outlines** Does the same as onion skinning, but displays only the outlines of the drawings.
- **Edit Multiple Frames** Allows you to apply edits to many frames at once, instead of forcing you to edit frame-by-frame.
- **Current Frame Display** Displays the frame currently being viewed.
- **Frame Rate** Shows the rate per second at which the frames move. Double clicking allows you to change the frame rate, set the size of your work area, and change colors, among other options.
- **Movie Time** Shows the time it takes for your movie to run.



Main Work Area This is where you'll be working on your projects, and where you'll view different effects before you finalize your animation files.

Property Inspector

- **Object** Shows the exact positioning of elements in the work area, and allows you to position them more precisely.
- **Frame** Shows a quick rundown of the properties of the frame you've selected.
- **Transform** Allows you to tweak the scale and rotation of a selected frame.
- **Scene** For a more theatrical setup, you can add and delete scenes to create a more linear presentation.

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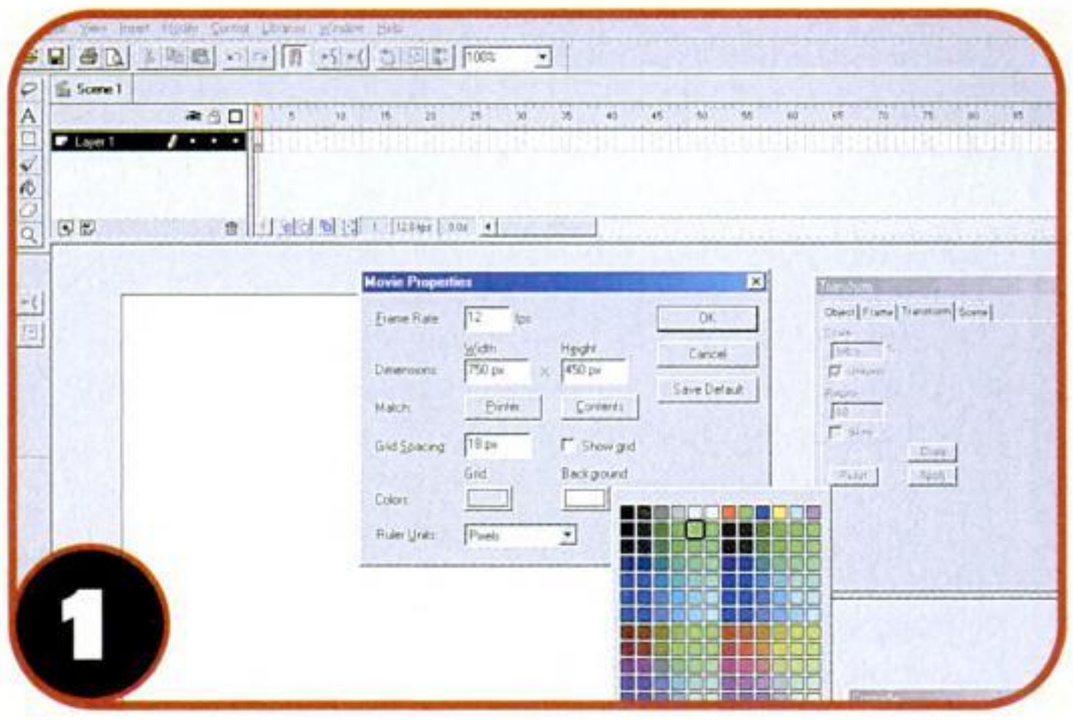
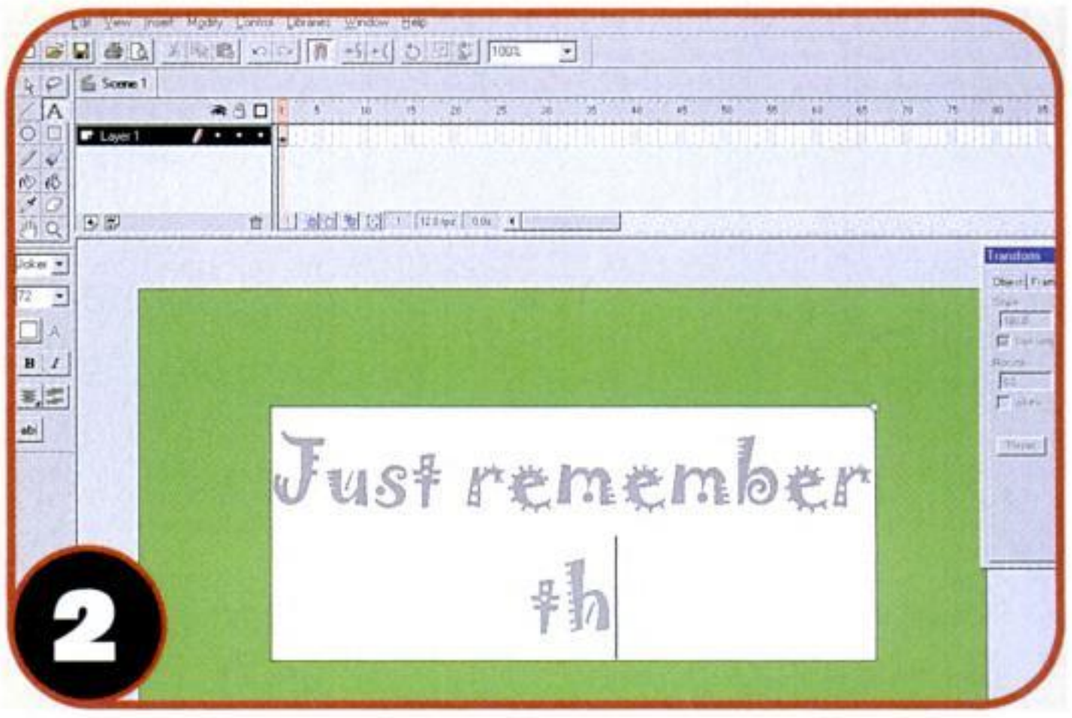
Project 1: Morphing Text

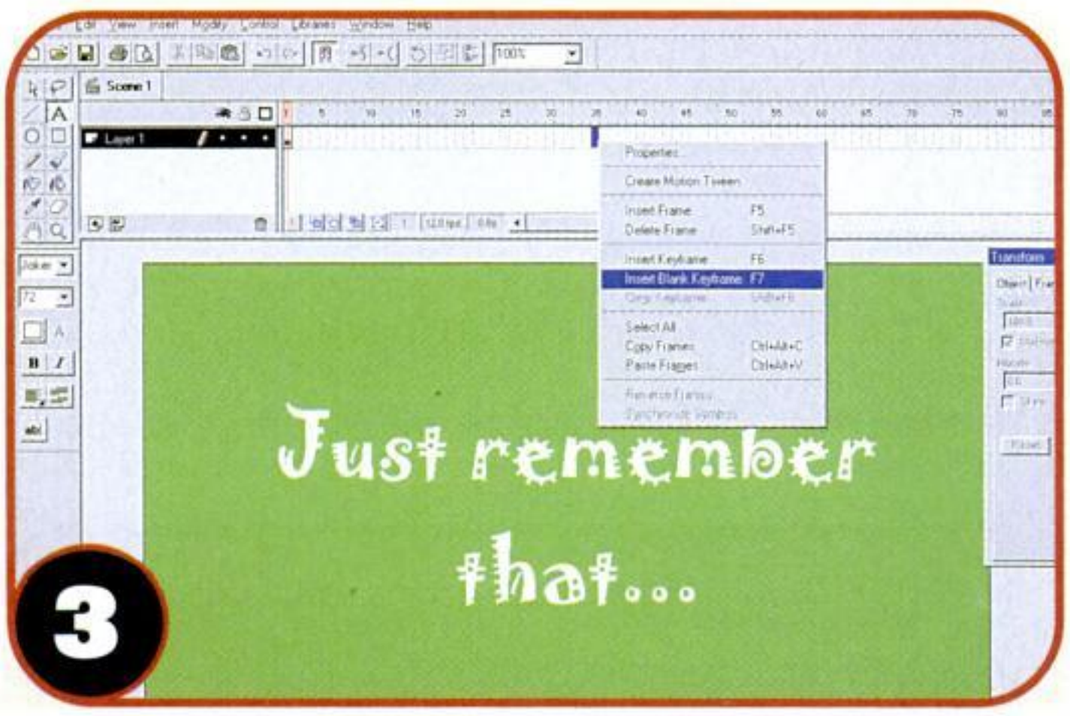
In this project, we'll make a sentence morph from one font to another. Use this type of animation to greet visitors when they first visit your site—just don't let it loop, or your patrons will get annoyed and leave.



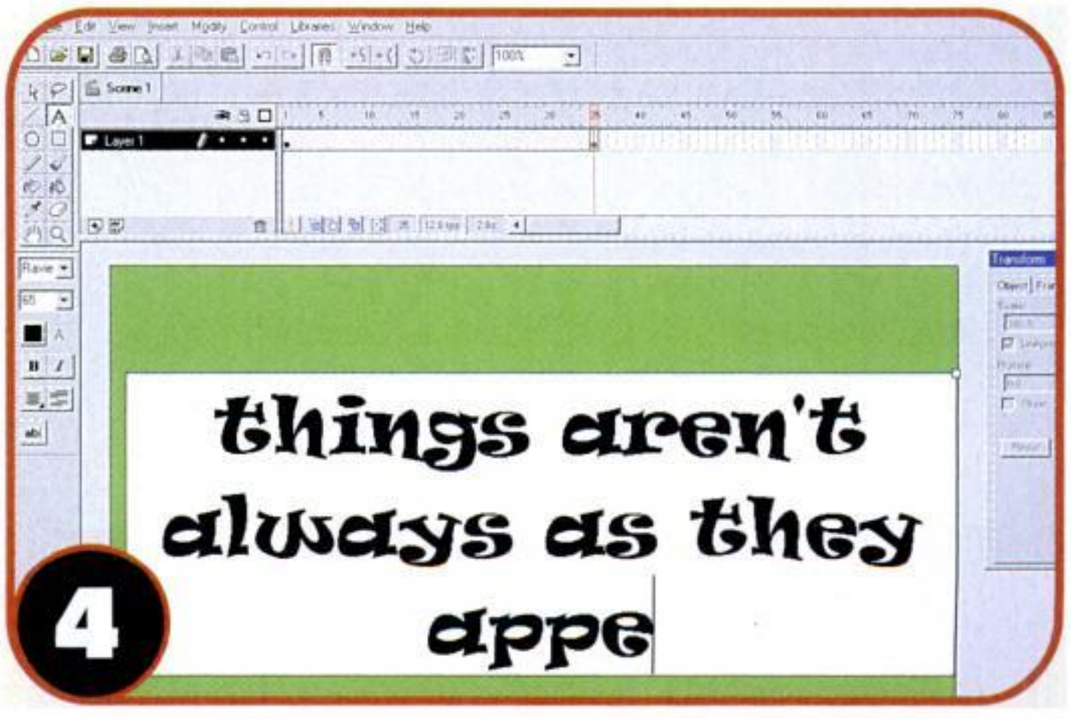
Open a new document. Double-click the frame rate button on the Timeline (it currently reads 12.0 fps), and when the Movie Properties window opens up, change the background color (we chose a funky lime green). You can also adjust your screen dimensions here. I like to work with 750px by 450px.



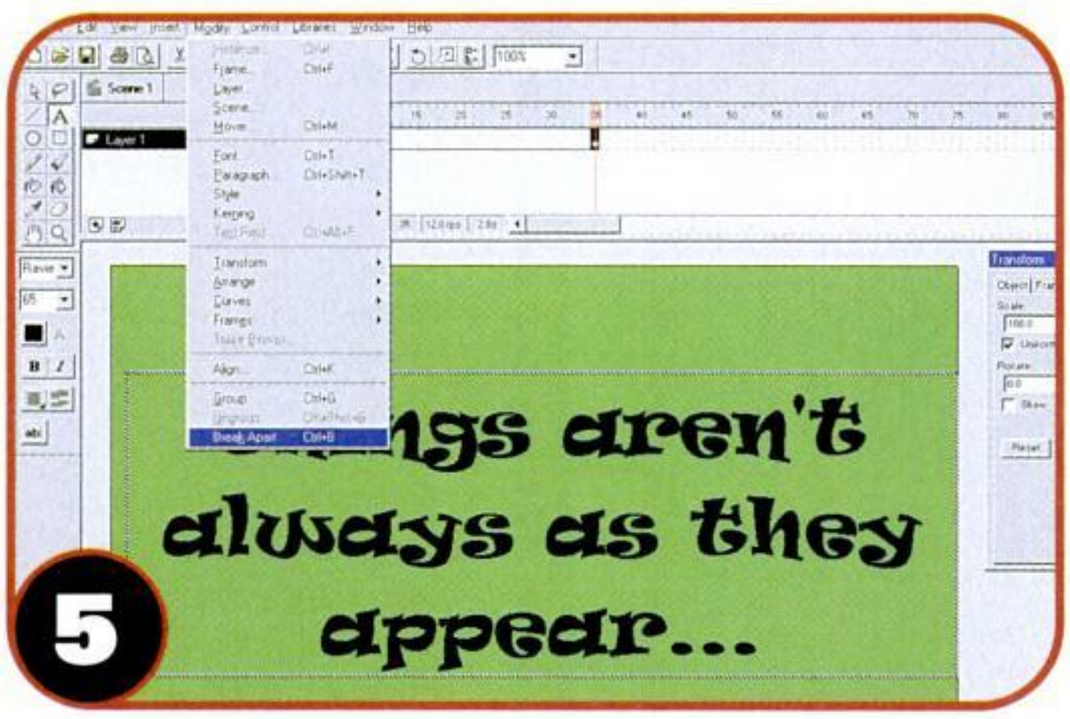
Click on the text tool in the toolbar. Check the modifier menu that appears below it. I made the text 72 point and white, and chose a wacky font (Jokerman). Now, click on the work area about halfway down from the top. A white box will appear. Type in the beginning of our sentence—"Just remember that…"—and center the text.



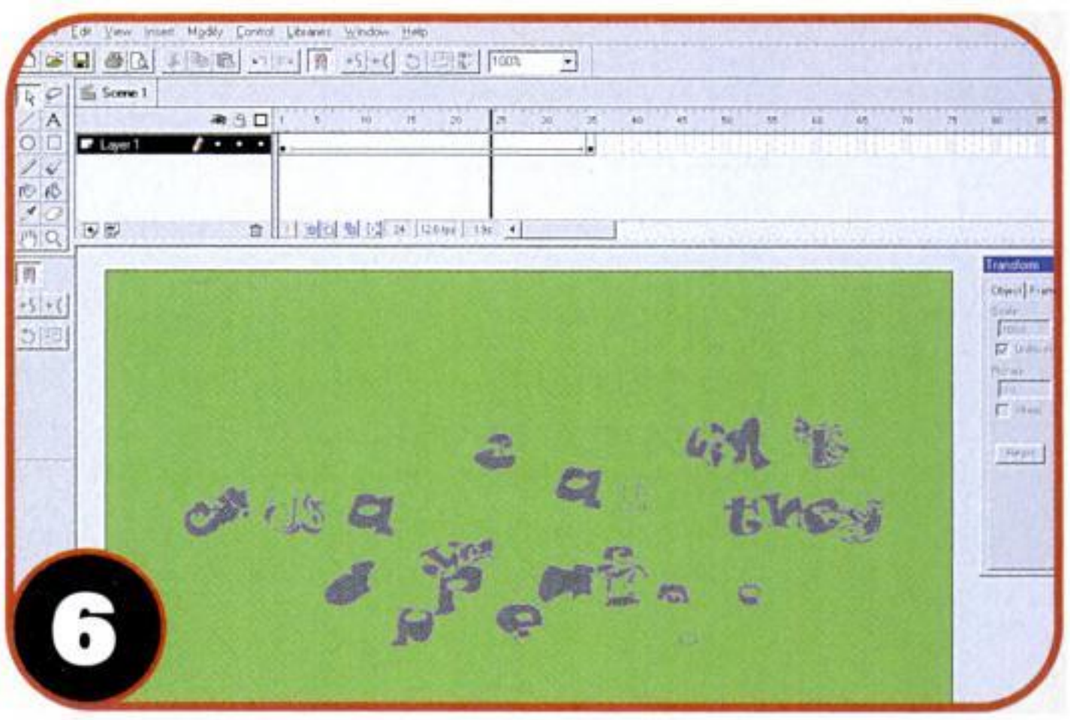
Select frame 35 in the Timeline and right-click your mouse. From the menu that appears, select Insert Blank Keyframe. You'll see a black circle that's empty in the middle. Notice the blank space that has formed between the two keyframes? This is where your morph will occur.



Select the text tool; type 65 in the size box, and change the text color to black. Now, choose another funked-out font—I went with Ravie. Type in the sentence: "Things aren't always as they appear." Now, click off of the text box, to see what your new sentence looks like against the green background.



Highlight frame 35 by clicking on it (when it's highlighted, a white border appears). In the Modify menu, select Break Apart. Now, your text should have no border around it, and should look as though it's covered in a net of gray lines. Repeat the same process on frame 1.



Double click frame 1, and a window called Frame Properties will pop up. Select the Tweening tab, and when your options appear, choose Shape, and click OK. In the Timeline you'll see a lime green line with an arrow through it. Use the controller to play your animation.

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SEE IT.

DIGITAL IMAGING CAMERAS CAMCORDERS

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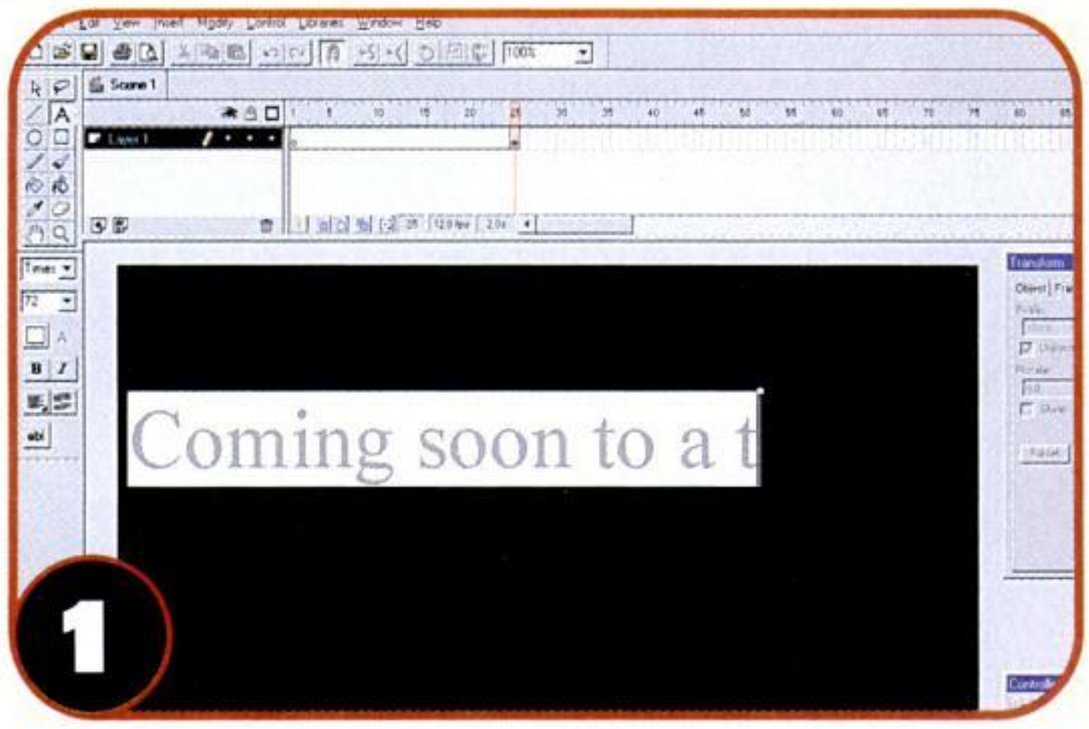
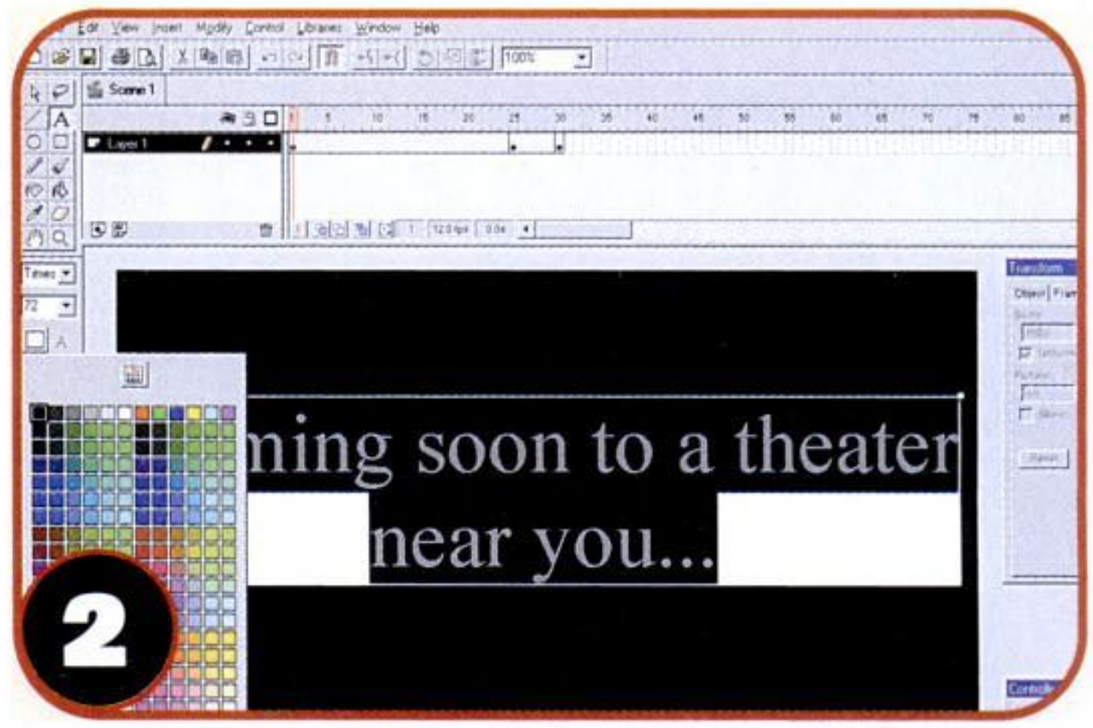
Project 2: Making an Exploding Movie Banner with a Fadeout

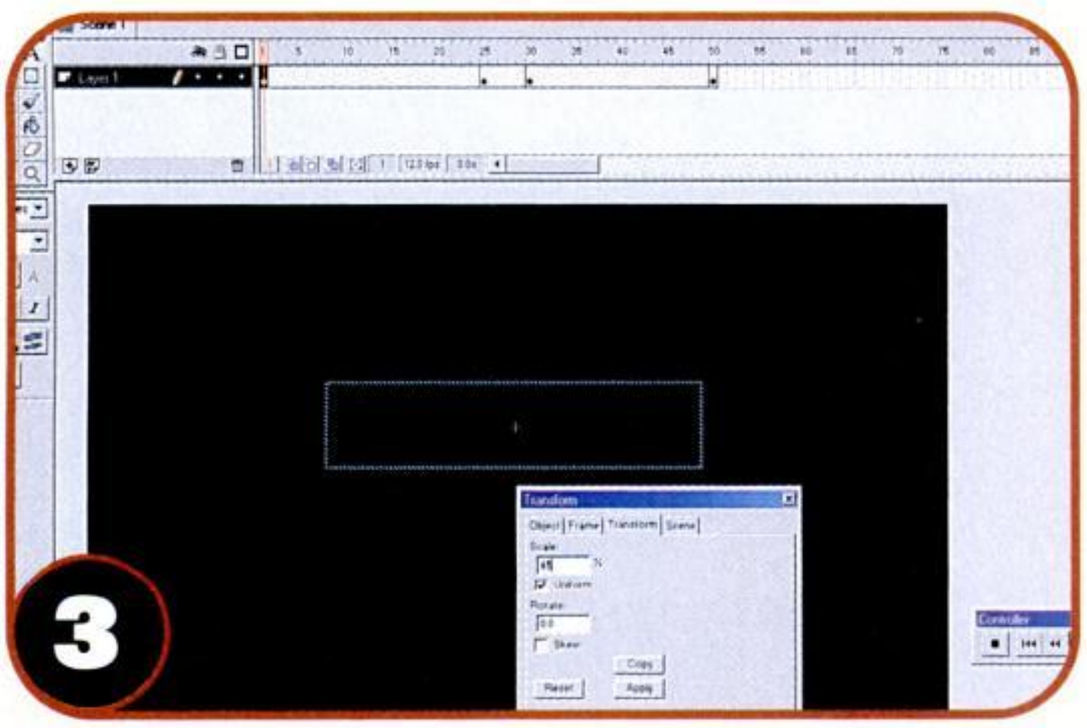
This effect is reminiscent of the opening sequence of Star Wars: stark white text emerging ominously from a field of black. Trust us, you'll know it when you see it.



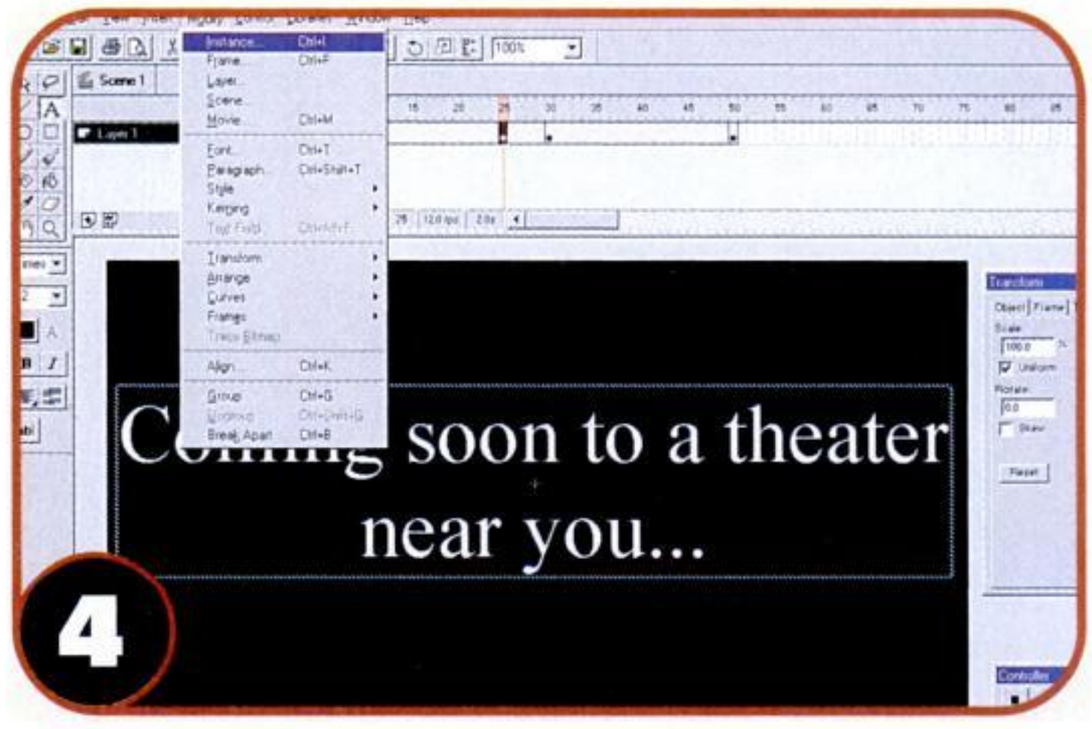
In a new document, click the frame rate button in the Timeline to change the background color/work area size. Go to frame 25 in the timeline, right-click, and select Insert Blank Keyframe. Click the text tool. Now set text preferences (Times New Roman, 72pt, white). In the work area, type: "Coming soon to a theater near you…".



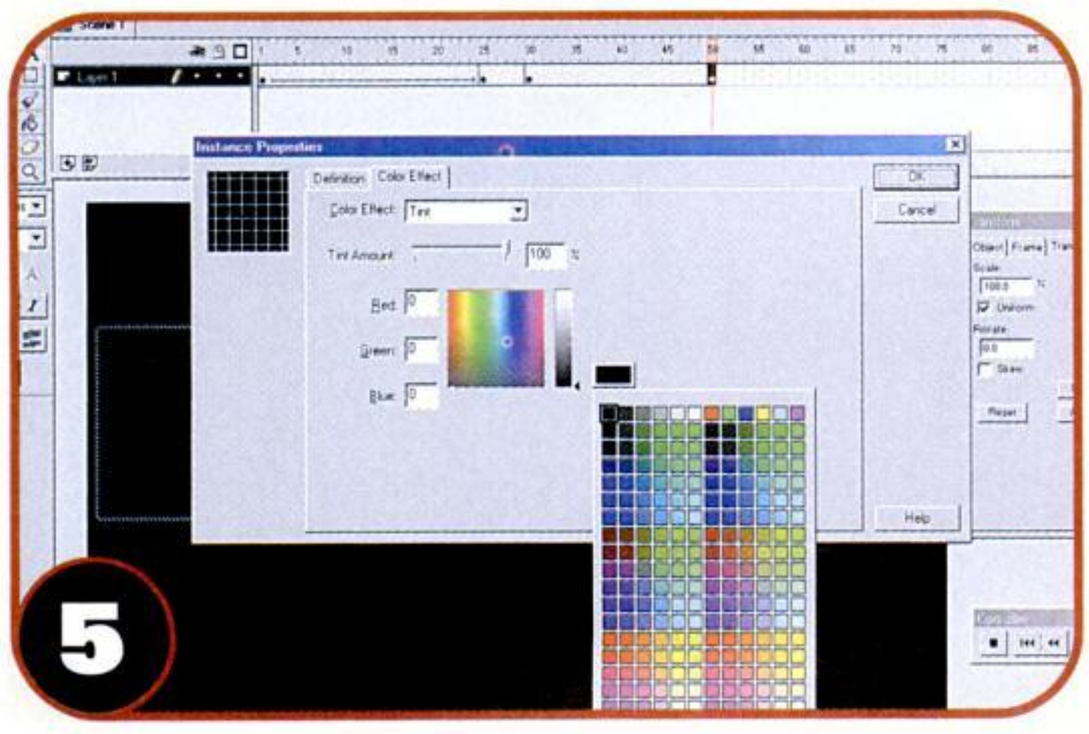
Right click frame 25 again. Select Copy Frames. Paste this frame to frames 30 and 1. Select frame 1 and click inside the bordered text box in your work area. Select all (Ctrl A) and change the text color to black. Click outside the text box; your text disappears. Now, select frame 1 in the Timeline, and copy it to frame 50.



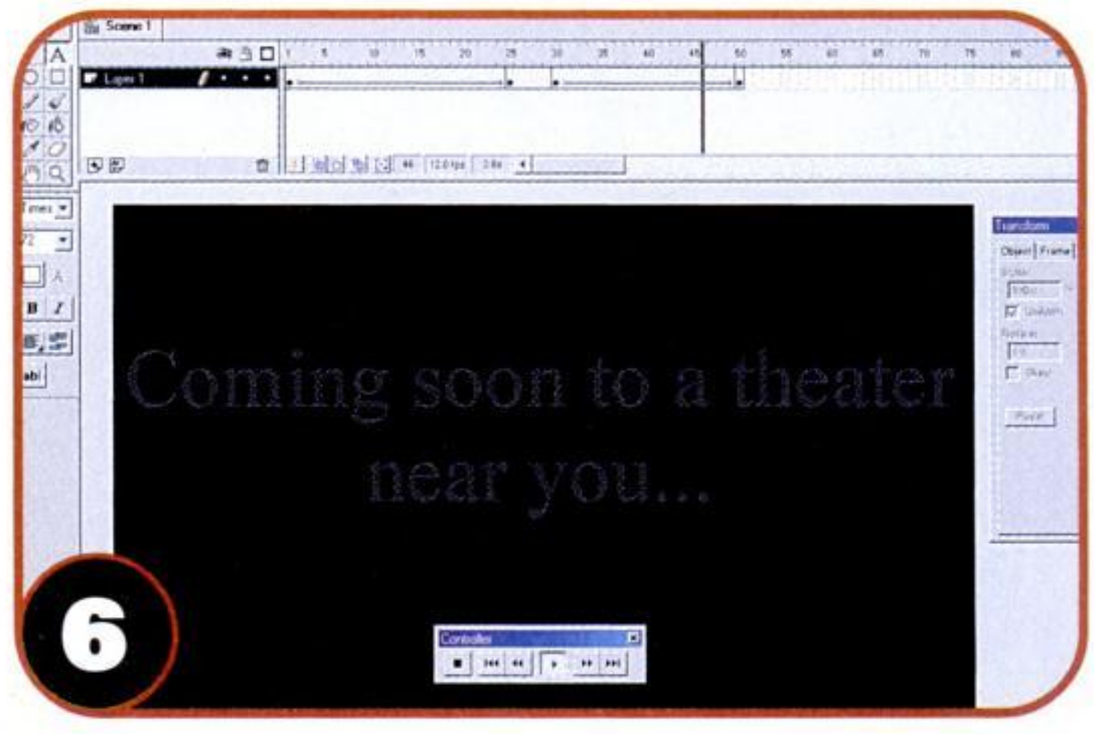
Select frame 1 again. Go to the Insert menu and select Convert to Symbol, then click OK. Go to the Property Inspector, which sits to the side of the work area, and select the Transform tab. In the Scale window, choose 45%, then click Apply. The black box will shrink. This will make your text both emerge from the dark and grow larger.



Select frame 25, go to Insert, and Convert to Symbol. In the Modify menu, select Modify Instance. In the Color Effects tab; select Tint. Move slider to 100%, choose white from the color palette, and hit OK. Select frame 1; Create Motion Tween from the Insert menu.



Select frame 50 and convert it to a symbol. Go to the Modify Instance selection. Select Color Effect and Tint. Move the slider to 100%, but this time, leave the color black, then click OK. We did this in Step 4, but this time, we're telling the text to fade back to black.



Select frame 31 on the Timeline and choose Insert, Create Motion Tween. Rewind the clip using the controller, then play it. Repeat this lesson to make more scrolling text messages that can be joined together in the Timeline.

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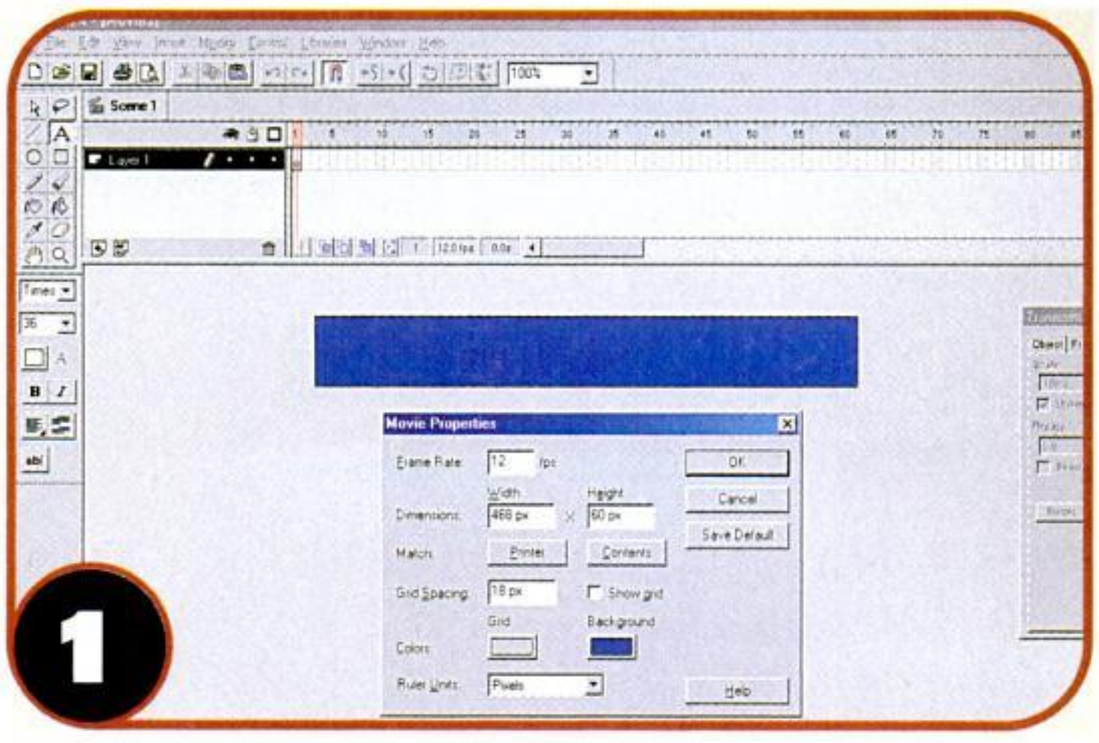
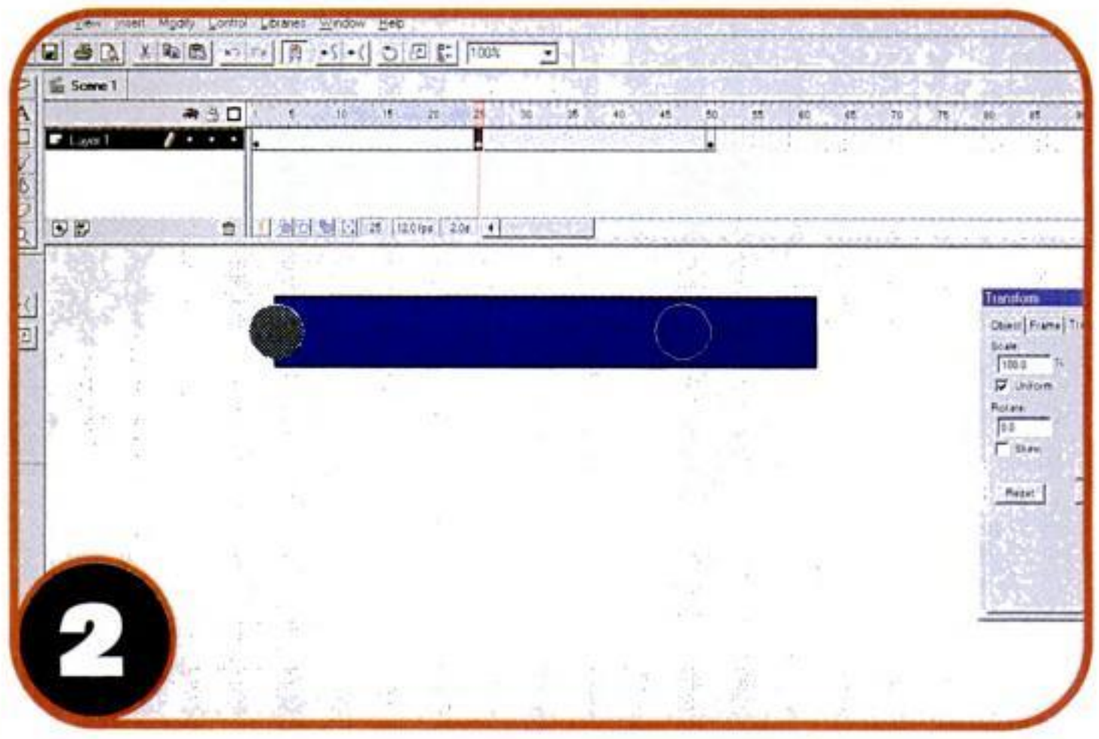
Project 3: Creating an Animated GIF Banner

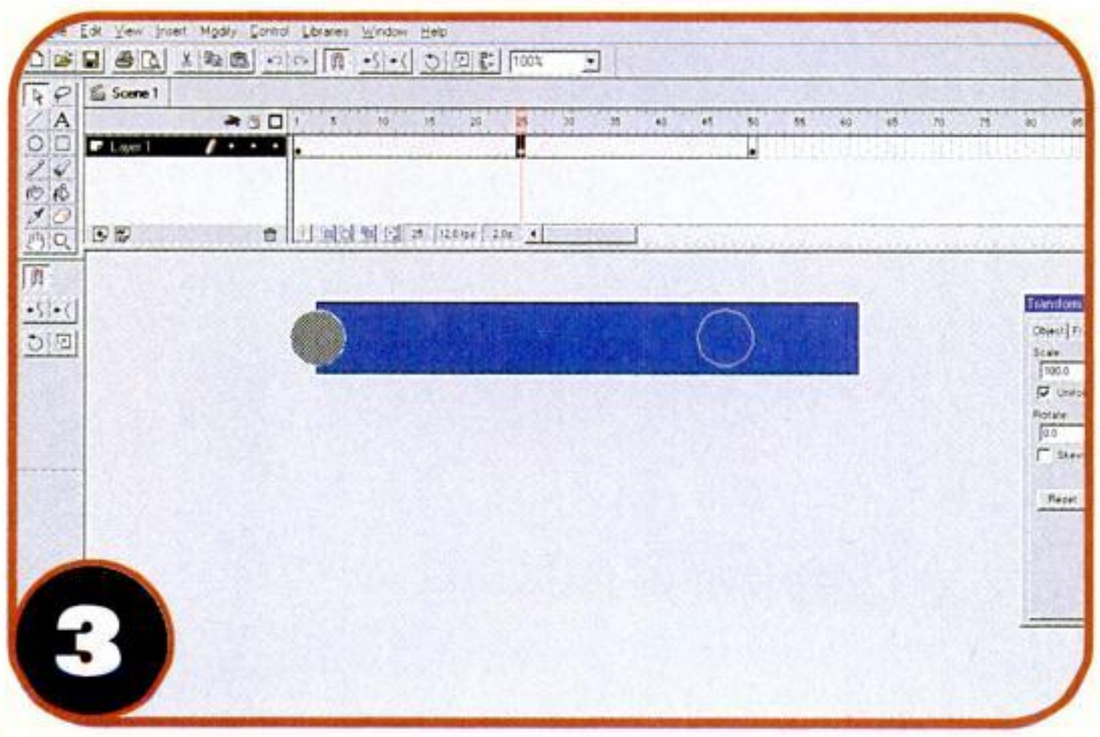
Tired of limp banners? We're going to pump some Viagra into them. Imagine a spotlight illuminating different parts of a sentence as it scans across a blue background. And remember: Go to our web site to see these effects in action. Shagadelic, baby!



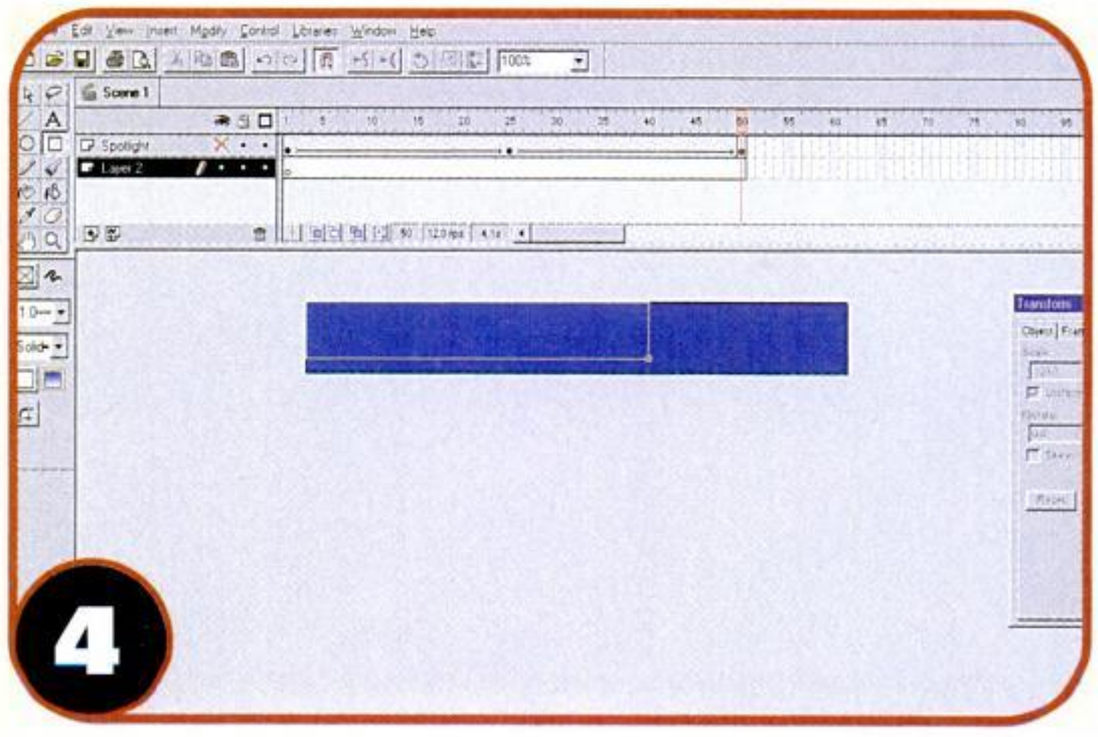
Open a new document, double-click the Timeline's frame rate button, and change the dimensions to 468x60 (this is the standard size for a web banner). Make the background bright blue, then click OK. You'll now see a blue web banner on your work area.



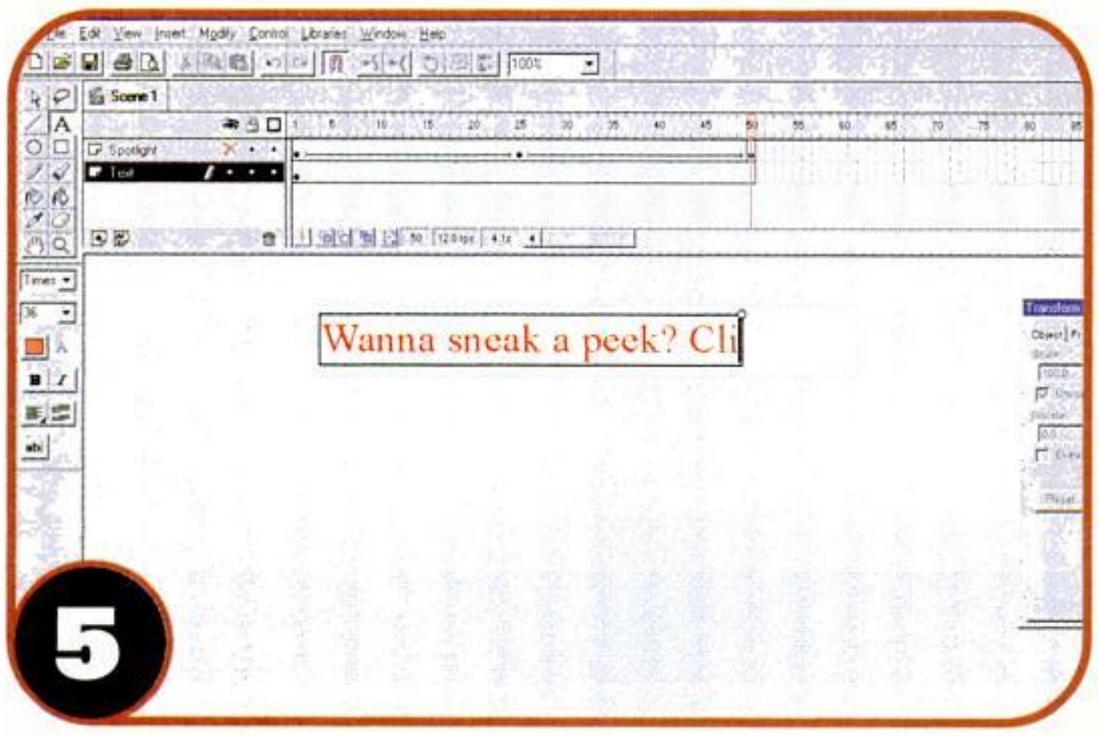
Use the circle tool to make a white circle just off the left side of the banner. Copy frame 1 and paste it to frames 50 and 25. Select frame 25 (be sure the white circle is grayed out) and use your arrow keys to move the circle to just off the right corner of the banner.



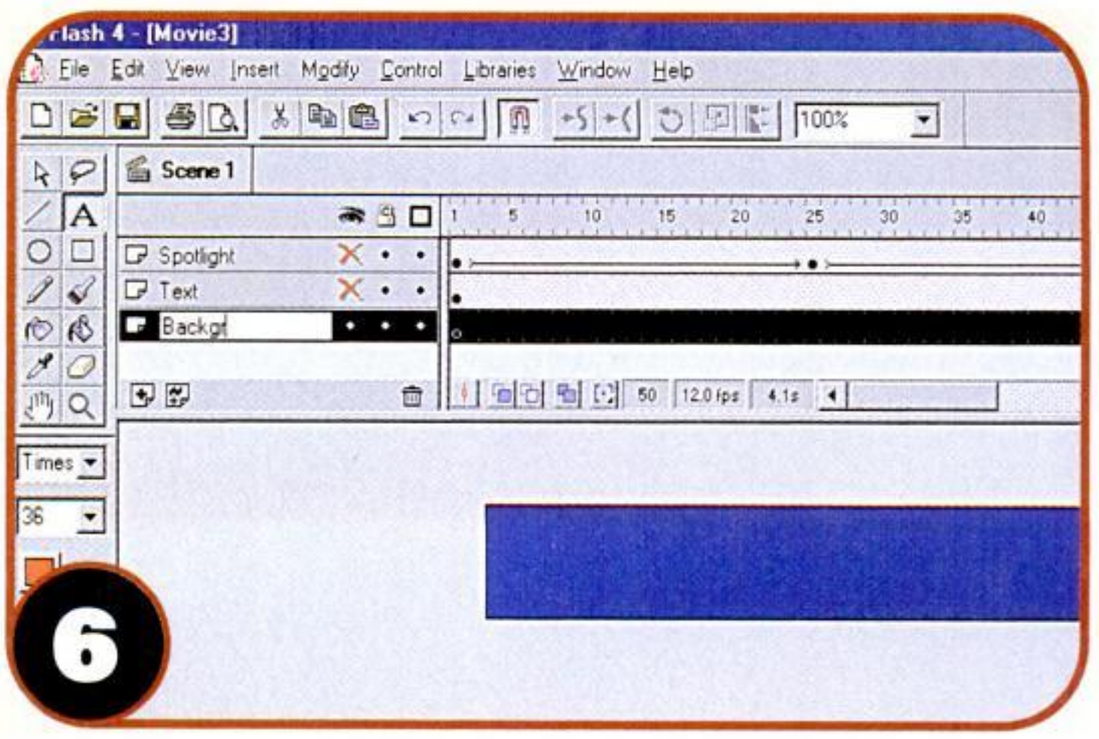
Make all three new keyframes into symbols. Go to Insert, and select Create Motion Tween twice—once at frame 1, and once at frame 25. Using the controller at the bottom, play the animation. You'll see your circle sweep from left to right and back again. Double-click on the words "Layer 1" in the layer box; name the layer "Spotlight."



Click the Add Layer button in the layer box. Move the new layer directly below the "Spotlight" layer. Select the square tool. Using modifiers, click the Fill Color button, and choose white. Make a rectangle exactly the size of the banner (if the spotlight layer is in your way, click on the eye next to it to hide it). Label this layer "Text."



Now, select the text tool; make the text size 36 and red. Type this sentence at the left edge of your new white box: "Wanna sneak a peek? Click me." Now, center the text. Click off the text box to see how it looks. This is the sentence that your spotlight is going to illuminate. Click the eye and hide this layer as well.



Use the Add Layer button for a 3rd layer. Drag the new layer underneath the "Text" layer. With the other layers hidden, you'll see only a blue banner. Name the layer" Background." Layers work like acetate. When you stack them, the content of each layer shows through.

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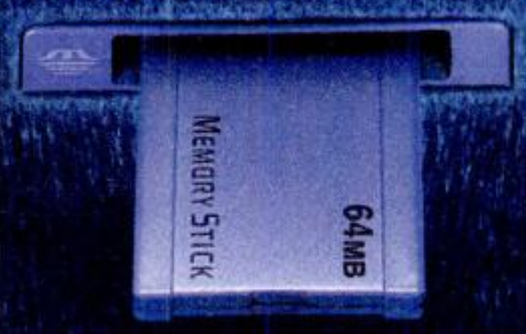
THINK IT.



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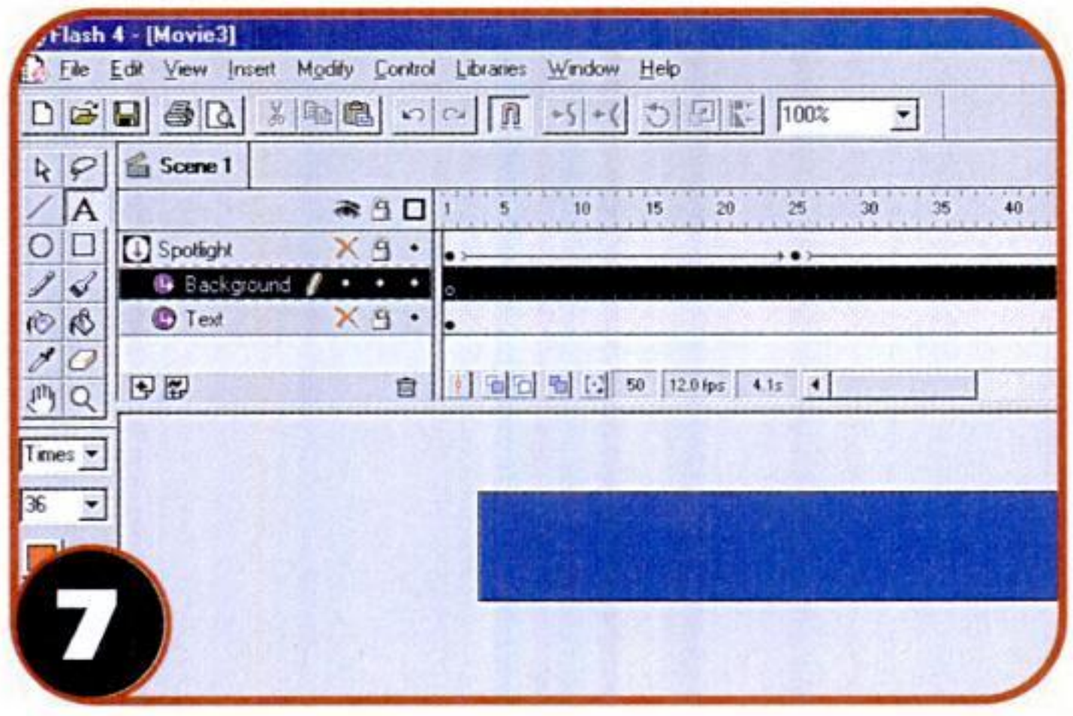
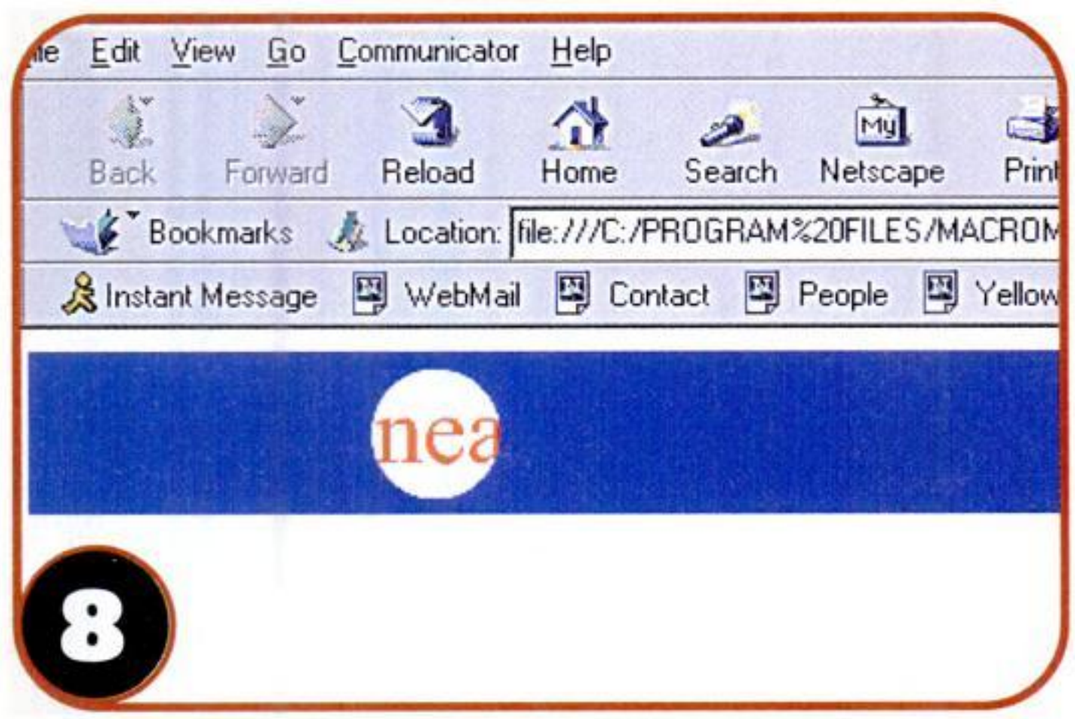


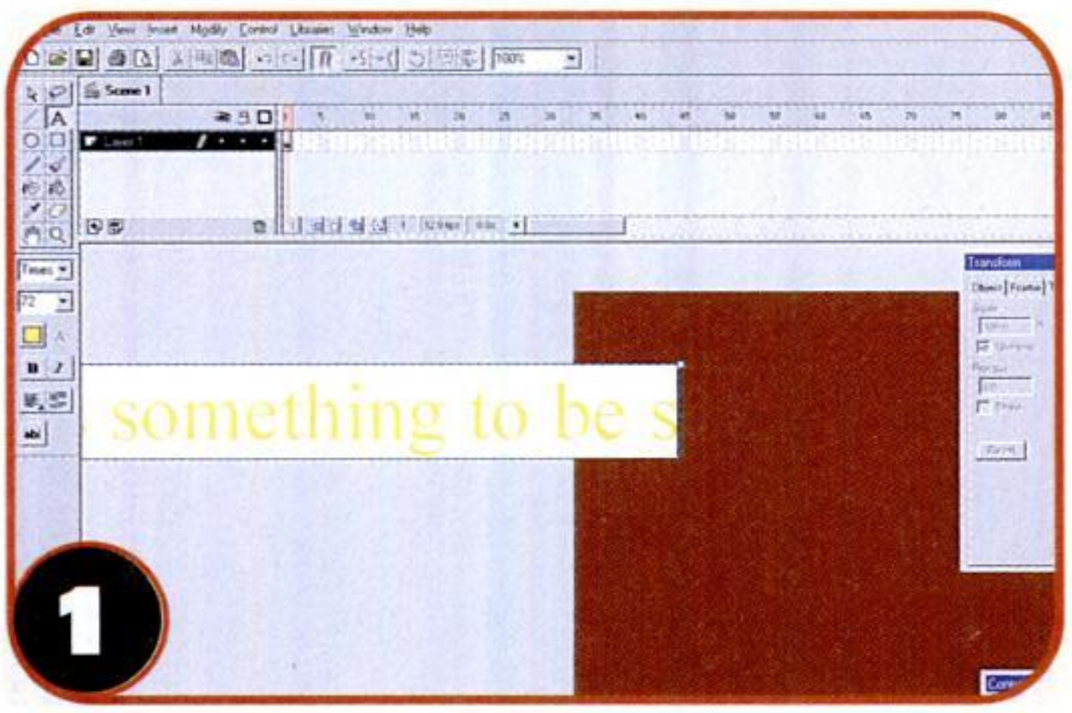


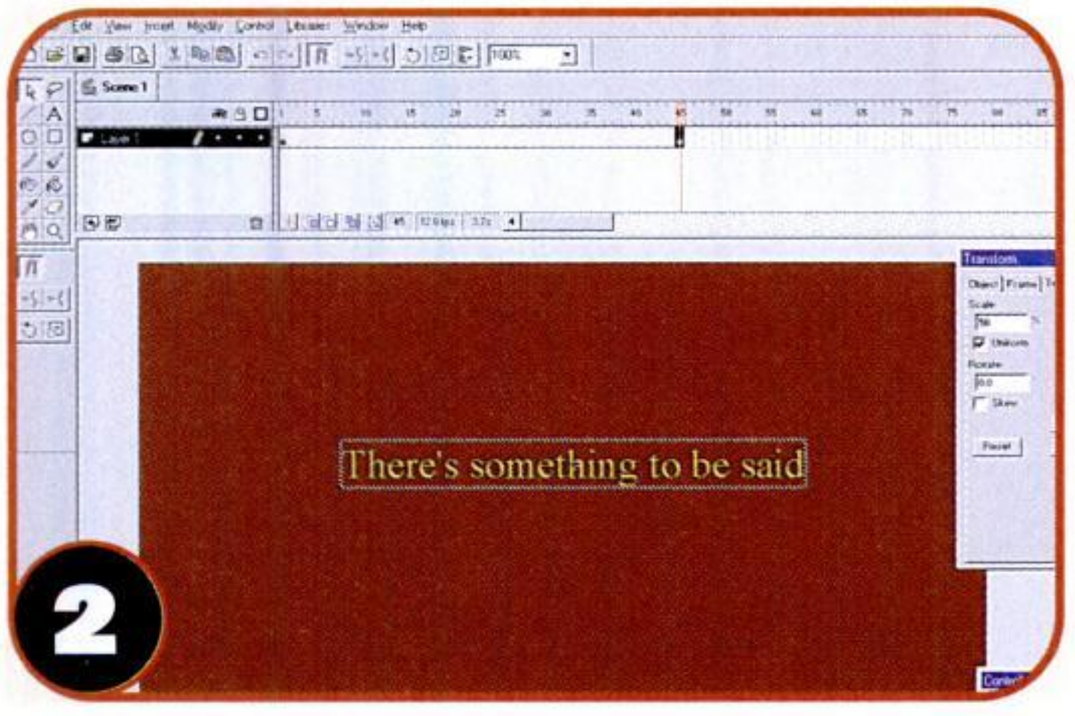
Right-click the "Spotlight" layer in the timeline (be sure it's the top layer); select Mask. You'll see a purple arrow next to the "Text" layer. Drag the "Background" layer between the "Text" layer and the "Spotlight" layer. It should have a purple arrow next to it, too.

Go to the File menu; from the pull-down menu, select Publish Settings. Select the GIF checkbox, and click the GIF tab. Under playback, select Animated and Loop Continuously; click OK. Go to File>Publish Preview-GIF. Like what you see? Go to File>Publish.

Project 4: Moving Text In From Offscreen

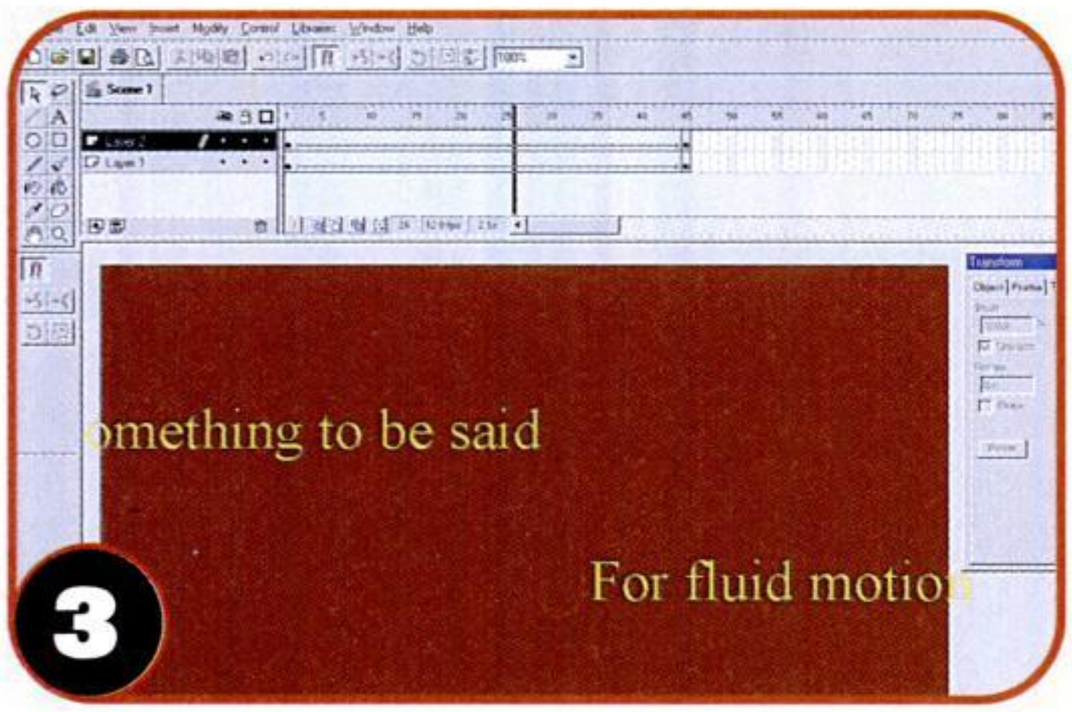
This time, we're going to make text move into the work area from off the screen. It's a cool effect that'll have 'em screaming for more.





Open a new document; adjust the background color to maroon. Click the text tool, and make your text size 72 and yellow. Click off to the far left of the work area and type: "There's something to be said." Click frame 1 in the Timeline and select Convert to Symbol.

Copy frame 1 to frame 45. Select frame 45; in the Property Inspector, change the scale to 50% and click apply. Select the Arrow tool and move the text box to the center of the work area. Go to frame 1; select Create Motion Tween from the Insert menu.



Click the Add Layer button. Repeat Steps 1 and 2 to make another sentence on the other side of the work area: "For fluid motion." Make sure that after you make it a symbol and scale it to 50%, you move your sentence just below where the sentence in Layer 1 ends. Tween your second layer. Watch the two sentences come together.

You're done! You've given your text more moves than the Kama Sutra. For even more functionality, download Macromedia's newest player at **www.macromedia.com**. For real-life examples of these effects, go to the Re:print section of **www.maximumpc.com**, or visit **www.geocities.com/gvisgilio** to see Geoff's own Flash projects.

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Why 2D Matters

Maximum PC tests the hottest 3D videocards for their 2D performance.

If you mainly use your PC for content creation, just how important is a brand new GeForce board to your computing experience? Like any of the new breed of videocards, the pixel-pumping prowess under the hood of the GeForce is primarily devoted to accelerating 3D games. Sure, Quake III *demands every drop of fill rate that it can squeeze from the 3D rocket you currently have parked in your AGP socket, but apps such as* Photoshop *don't really benefit from all the bells and whistles found on a next generation board. Or do they?*

—Sean Downey

Using our standard test bed, Departments Editor Sean Downey ran eight videocards through five graphics application benchmarks, to see whether 2D is actually just one less D for 3D cards to worry about.

At *Maximum PC*, we take for granted that high-powered 3D rendering is synonymous with Pure PC Power. In fact, we wish every application took advantage of 3D rendering effects. Anti-aliasing techniques such as 3dfx's T-buffer would do wonders for text readability, and alpha-blended transparencies would add a lot of life to boring web pages. Unfortunately, that's a lot to ask of most applications, especially such mainstays as Microsoft *Word* and Netscape *Navigator*, which just don't need added flash (or programming overhead) to get the job done. Sure, it would be nice to do everything in 3D, but at this point there just isn't a compelling need for 3D acceleration outside of games.

Since mainstream apps don't take advantage of the 3D rendering pipeline, it's difficult to determine whether an individual program truly benefits from a more powerful videocard. When it comes to simple text and bitmap manipulation, performance doesn't really vary from card to card, since drivers have been optimized ad nauseum for the same set of Windows API calls. In most cases, system-memory bandwidth, CPU speed, and the application's own image processing efficiency have more of an effect on app performance than the videocard or the driver.

For graphics applications, however, there *is* room for videocard acceleration, since most of these apps handle large bitmap images and push a lot of data on screen. To test how well videocards accelerate graphics apps, we constructed a custom script using *SYSMark 98*, and ran it on the latest and greatest videocards. The results of our benchmarks are charted below. Here's the breakdown:

▶ **Bryce 3D** This fractal landscape generator uses a software ray tracing renderer. This means it doesn't take advantage of the 3D acceleration capabilities of your videocard when drawing the lines, wireframes, and landscapes that make up its 3D worlds. The *Bryce* benchmark renders three scenes in succession and reports on how efficiently the scenes were rendered. With the fastest RAMDAC (a whopping 360MHz) and super solid 2D drivers, the Matrox Millennium took home the Bryce trophy, but the spread wasn't substantial enough for us to draw any real conclusions from it.

▶ **CorelDraw 8.0** The venerable everything-to-everyone graphics app does page layout, vector illustration, and photo manipulation. More than anything, the *CorelDraw* benchmark's nonstop sequence of image tweaks illustrates how fast the videocard can keep the screen updated. Considering the margin by which the Matrox Millennium outpaced the other cards in this benchmark, we can conclude that a fast RAMDAC and well-written drivers combined with a beefy memory interface make a huge difference in keeping pixel data flowing to the screen.

▶ **Photoshop 4.0.1** Since it's primarily used for manipulating and retouching large images, *Photoshop* is a great test of the videocard's ability to handle large bitmap images. While the *Photoshop* benchmark doesn't update the screen as much as the *CorelDraw* benchmark, it does throw large chunks of data down the pipe. Since the Permedia3 Create! is built to handle large bitmaps more efficiently by treating them as virtual textures (see review in the December issue), it took the *Photoshop* crown, but the other cards weren't too far behind.

▶ **Extreme 3D 2.0** The heavy software rendering done to construct Extreme 3D's models and animations is more a test of the CPU than the videocard. This is another case in which the Create!'s efficient use of large bitmaps pays off a little.

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▶ **Premiere 4.2** For most applications, *Premiere* is dependent on the video capture device's encoding and decoding capabilities, than it is on the 2D display capabilities of the videocard. The videocard is more of an intermediary in *Premiere*, and it doesn't significantly affect the performance of the app. Primarily, the benchmark is a test of how harmoniously the driver works with the application. In this case, the Annihilator Pro's display driver fits best in *Premiere*'s scheme of things.

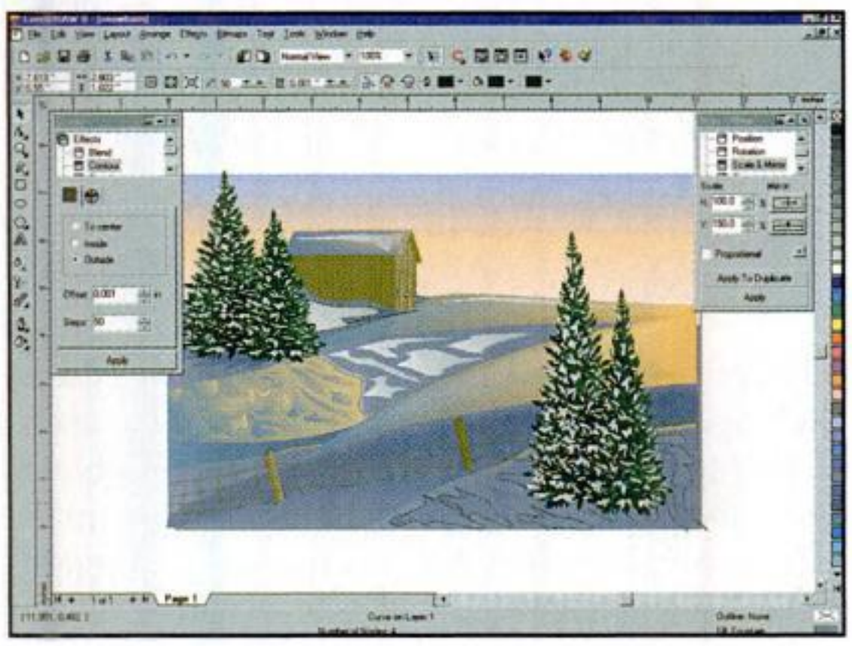
From our benchmarks, it's clear that graphics applications actually benefit a little from videocard advances. Raw hardware improvement—such as a faster RAMDAC, an increased core clock, and a broader memory bus (along with faster video memory)—allow the videocard to process more commands and get pixels onscreen faster. Unfortunately, since all the videocard does in most graphics apps is throw the finished image on screen, there's not much that can be done in the way of acceleration.

Graphics apps, like all Windows apps, follow a standard behavior set designed to make resource sharing a painless process. Unlike most full-screen 3D games, Windows applications need to relinquish control of vital system resources when the OS or another app taps them on the shoulder. For this reason, the standard Windows GDI doesn't allow direct access to a videocard's memory—a feature that's essential to the card's ability to accelerate a given process. Instead, image data is stored in system memory, where the application directly manipulates the image without any assistance from the videocard.

While this explains why videocards don't accelerate *Photoshop* filters, it doesn't tell the whole story. Graphics apps tend to perform operations that the videocard can't accelerate anyway, such as color sorting and applying funky filter effects. Every application has a different kind of graphical magic to use on an image, so it would be impossible for a videocard to accelerate every operation. For the majority of graphics apps, working through system memory is actually preferred.

Photoshop **is built to manipulate large images, making it a great test of how well a videocard can move image data.**

Nonetheless, in order to get image updates onscreen, the graphics app needs to call on the videocard to put them there. This is where a well-written driver can make a difference. Of course, the difference is marginal at best, but bragging rights are bragging rights. The real deal occurs when the hardware takes over. When it comes to graphics apps, all the videocard does is move data from system memory to video memory, so the memory bus between the graphics processor and local memory plays an important factor. The broader the bus, the faster an image can be updated, and the faster an image is updated, the sooner a graphics app can move on to its next task.



The *CorelDraw* benchmark throws a constant stream of updates at the card, making it an excellent test.

Complimenting a fast memory interface on the videocard is a fast RAMDAC, which converts the digital data in video memory into analog signals for monitor output. While the ultraspeedy RAMDACs, found on such cards as 3dfx's Voodoo3 3500TV and Matrox's Millennium G400 Max, make for flicker-free, high-resolution displays, they also pop pixels onscreen as fast as fast can.

The 2D side of things still doesn't gain much from the horsepower a videocard is capable of. When it comes to graphics apps, 2D performance gains are more a byproduct of innovations on the 3D accelerator front than a primary design concern. Of course, all of this will change when everything goes 3D. ✹

DARE TO COMPARE: CREATIVE GRAPHIC APP PERFORMANCE

APP	Creative Labs 3D Annihilator Pro	3D Labs Permedia 3 Create!	Matrox Millenium G400 Max	Guillemot Maxi Gamer Xentor 32	3dfx Voodoo³ 3500 TV	S3 Viper 2	ATI Rage Fury Pro
Bryce 2	204	207	**210**	203	207	203	206
CorelDraw 8.0	217	218	**231**	217	211	205	209
Photoshop 4.0.1	197	**199**	195	195	197	192	193
Extreme 3D 2	205	**206**	204	205	204	200	202
Premiere 4.2	**220**	213	219	219	218	208	215

NOTE: Best scores are indicated in red. All benchmarks were done on our Dell 500MHz Pentium III system.

For definitions of Terminator words, hyperlink to the back of Maximum PC, or check out the Terminator online at www.maximumpc.com.

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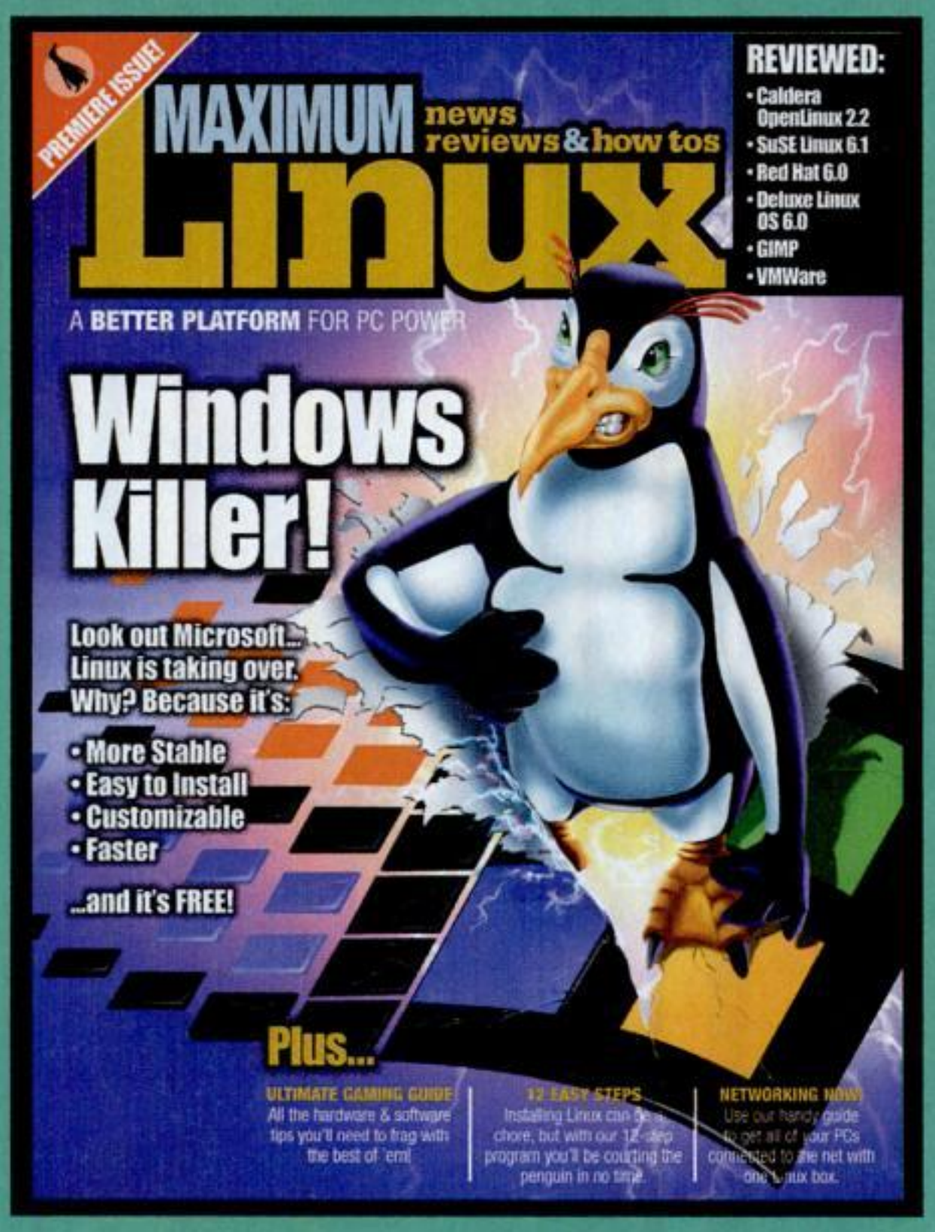
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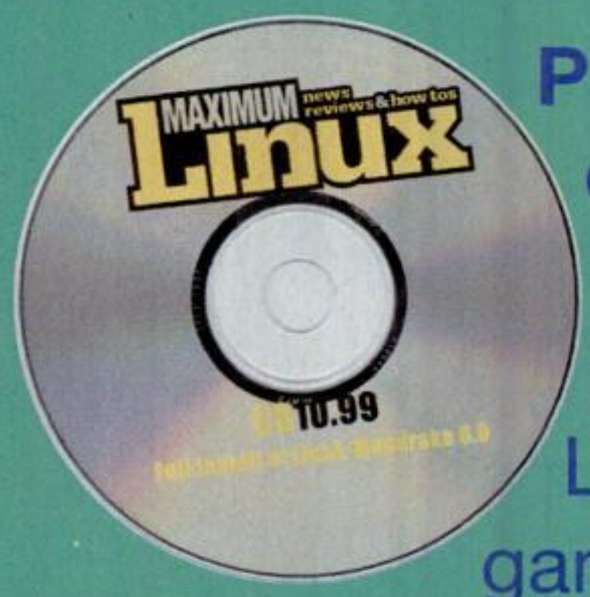

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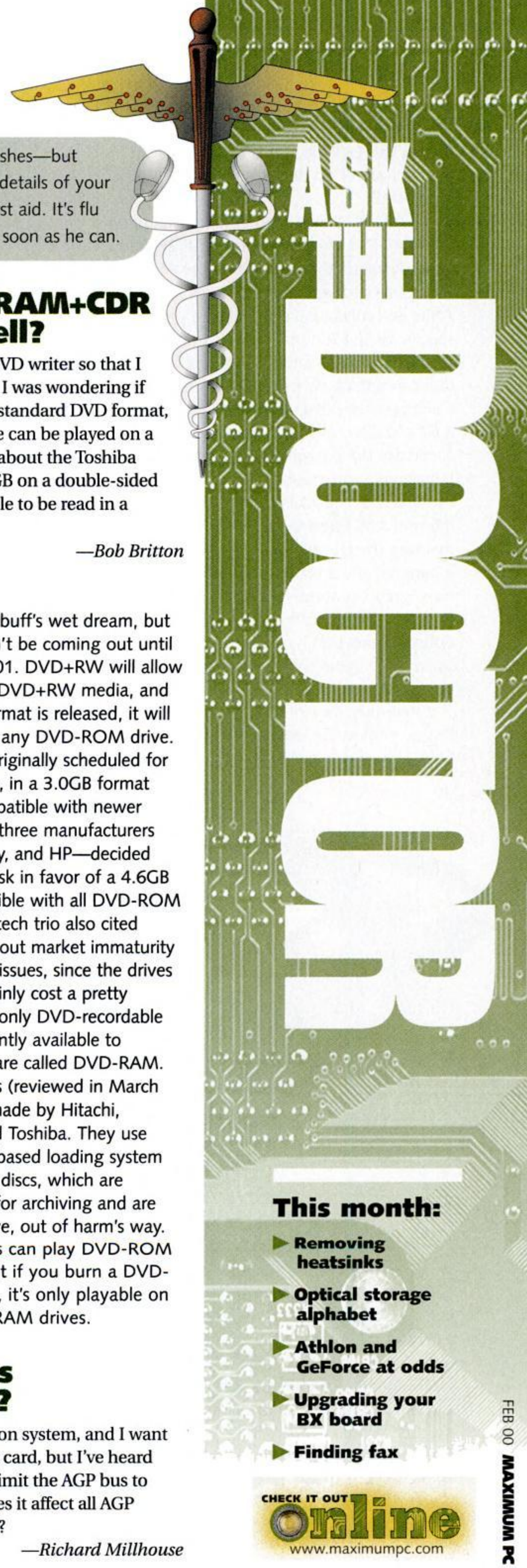
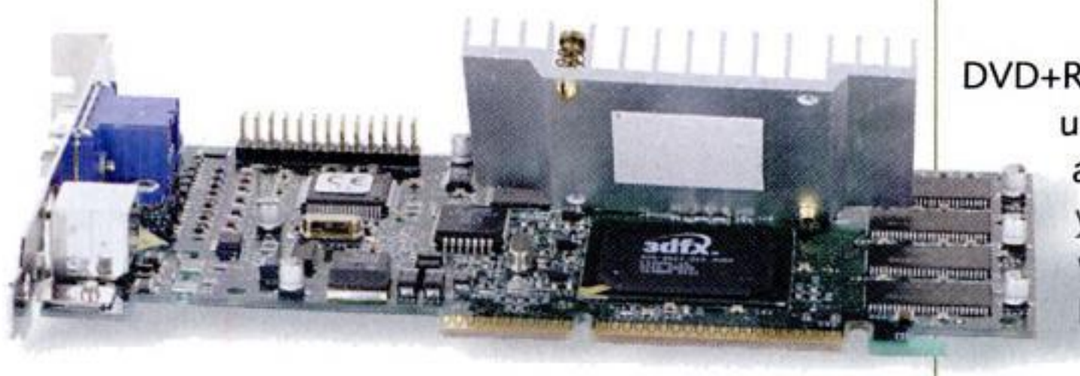


A voided warranty isn't so bad

All the recent videocards I've bought have had really dense heatsinks on them, but I like to go the extra mile and add a fan. I want to remove the heatsink, since the dense fins usually restrict airflow, but they are all "glued" onto the chips really well. I have heard of using lighter fluid to remove the glue left behind, but how do you get the heatsink off first?

—Michael Swanner



This Voodoo³ is naked! Note the large pins that hold the heatsink to the card, and the tape that keeps it in place.

To remove the heatsink from a videocard, you have to just rip that sucker off. It helps if the chip is hot, which can be accomplished either by playing some heated deathmatches or by heating the chip with a hair dryer. Once you think the glue below the heatsink is soft enough to let go, gently twist off the heatsink, and voilà—your warranty is voided! If any excess glue remains on top of the chip, gently nudge it off, or use a solvent, such as nail polish remover, to get it off.

"Once you think the glue below the heatsink is soft enough to let go, gently twist off the heatsink, and voilà—your warranty is voided!"

If you don't think you have the stomach for this process, you can buy a slot cooler that fits into any PCI or ISA slot and blows cool air directly onto the card seated next to it. But if you decide to go for broke, there are a few rules you must follow: Use caution when ripping pieces of your computer apart, and don't blame us if anything bad happens.

To be fair, we should add that original heatsinks should do a fine job of cooling any video chipset that hasn't been overclocked. However, heatsinks are designed to dissipate heat, and can therefore actually add to internal case temperatures.

DVD+CD-RW/RAM+CDR = What the hell?

I'm looking to purchase a DVD writer so that I can duplicate a DVD-ROM. I was wondering if any DVD writer supports a standard DVD format, so that whatever disk I write can be played on a standard DVD drive. I read about the Toshiba writer, which can burn 5.6GB on a double-sided disk, but will this disk be able to be read in a regular DVD-ROM drive?

—Bob Britton

DVD+RW is every storage buff's wet dream, but unfortunately, it won't be coming out until at least the year 2001. DVD+RW will allow you to record onto DVD+RW media, and when the 4.6GB format is released, it will be compatible with any DVD-ROM drive. DVD+RW was originally scheduled for release in the Fall of 1999, in a 3.0GB format that would have been compatible with newer DVD-ROM drives. But the three manufacturers of DVD+RW—Phillips, Sony, and HP—decided to hold off on the 3.0GB disk in favor of a 4.6GB version that will be compatible with all DVD-ROM drives. The tech trio also cited concerns about market immaturity and pricing issues, since the drives would certainly cost a pretty penny. The only DVD-recordable drives presently available to consumers are called DVD-RAM. These drives (reviewed in March 1999) are made by Hitachi, Pioneer, and Toshiba. They use a cartridge-based loading system to keep the discs, which are often used for archiving and are very sensitive, out of harm's way.

The drives can play DVD-ROM media, but if you burn a DVD-RAM disc, it's only playable on other DVD-RAM drives.

GeForce slows down Athlon?

I'm looking to build an Athlon system, and I want to put in an nVidia GeForce card, but I've heard that Athlon motherboards limit the AGP bus to only 1x. Why is this, and does it affect all AGP cards, or just GeForce cards?

—Richard Millhouse

This month:

- **Removing heatsinks**
- **Optical storage alphabet**
- **Athlon and GeForce at odds**
- **Upgrading your BX board**
- **Finding fax**

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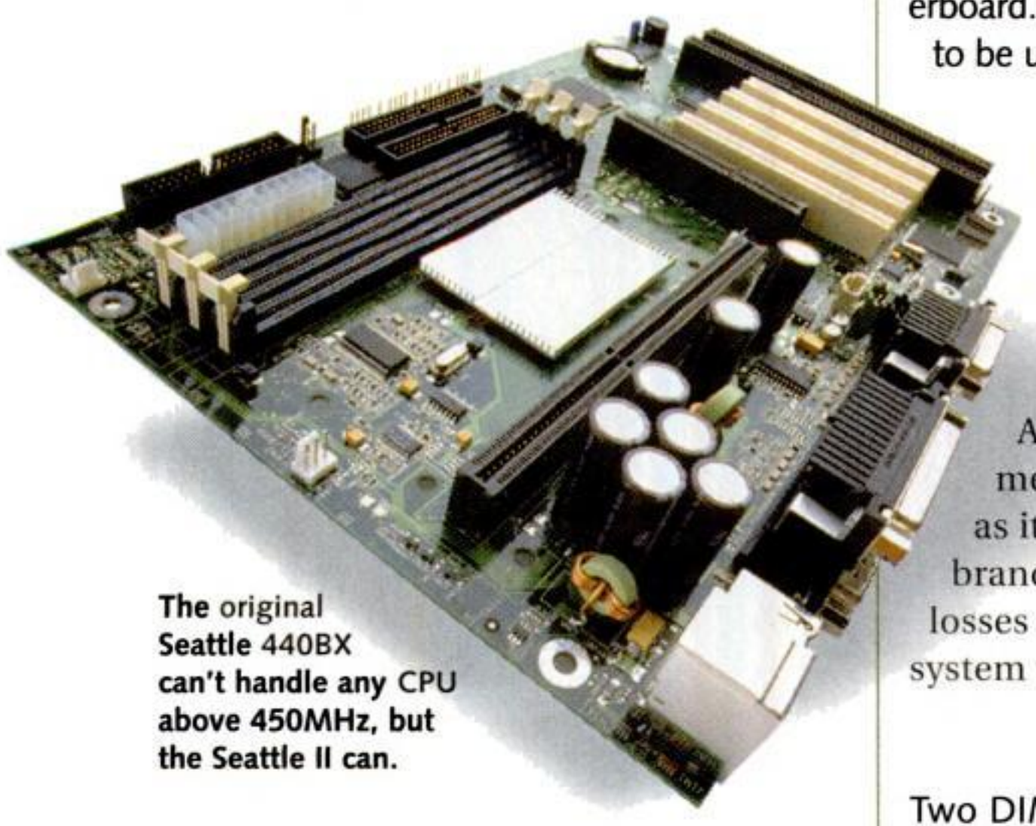
We'd heard about this as well, so we went straight to our sources at AMD. They confirmed the 1x limit, but said that it has a minimal affect on performance. Peep this from AMD:

"All AMD Athlon motherboards featuring the AMD 751 chipset support AGP 2x, and none of the motherboards limit the AGP bus speed to 1x for any graphics cards. However, AMD and nVidia have identified a problem specific to Slot A motherboards using the AMD 751 chipset and the GeForce256 GPU that can potentially cause system hangs. GeForce reference graphics drivers (version 3.62 and later) include a workaround that eliminates the potential system hangs. This temporary workaround involves lowering the speed of the AGP connection to 1x. Internal AMD testing of the drivers implementing the current workaround results in a minimal effect on overall performance on most graphic-intensive applications, which is almost entirely offset by additional optimizations that have been implemented since the original GeForce reference drivers were first introduced."

Obviously, 1x isn't as fast as 2x or 4x, but an Athlon/GeForce combo is still the best gaming setup money can buy.



The original Seattle 440BX can't handle any CPU above 450MHz, but the Seattle II can.

BX Blues

I have an Intel Seattle SE440BX motherboard and an Intel 400MHz Pentium II chip. I'd like to upgrade my Pentium II 400MHz to a Pentium III, but Intel's web site says the fastest P-III processor that can be put on this motherboard is a 450MHz. Several months ago I saw advertisements for vendors selling my motherboard with P-III 500 and 550 chips. My question is, What's the fastest P-III chip that can be put on this motherboard? Is it necessary to buy the SE440BX II or equivalent motherboard for the faster processors?

—Jean Werth

The Doctor recommends that you follow Intel's advice: Don't put anything higher than a 450 in that mobo.

A call to Intel confirmed our suspicion; the board can't handle voltage requirements for anything higher than a P-III 450. It's a shortsightedness that'll bite many SE440BX owners when they reach to scratch that upgrade itch. The problem doesn't seem to affect other BX boards manufactured during that time period, though; vintage Asus P2-B boards typically handle everything Intel can make on the 100MHz bus.

It's not worth the dough to make the jump from 400MHz to 450MHz, since you'll see only marginal improvements, at best. We recommend saving up some cash and splurging for a Coppermine and a new motherboard. It's a combination that's guaranteed to be upgradeable for quite some time.

DIMM dilemma

I was wondering whether there's any performance advantage to having a single 128MB DIMM instead of two 64MB DIMMs. Also, does it matter whether the memory is the same brand, as long as it's the same speed? Could different brands of memory in a system cause losses in performance, or make the system unstable?

—Paul Wetter

Two DIMMs will offer the exact same performance as one DIMM, though it's always beneficial to keep a DIMM slot open for future expansion. If you've got several open DIMM slots, feel free to buy either two 64MB DIMMS or one 128MB DIMM; it really doesn't matter.

As for mixing memory brands within a PC, this is very dangerous, and is in fact *banned* in 19 states. Seriously, mixing brands isn't a big deal, and according to a spokesman from memory maker Kingston, is almost never a problem for desktop PCs. Once in a blue moon, mixing brands could lead to problems, but they're usually associated with varying chip densities or different IC chip manufacturers.

"Although a routine installation of Windows 98 (either edition) won't install a Fax applet, the files remain on the CD, ripe for the taking."

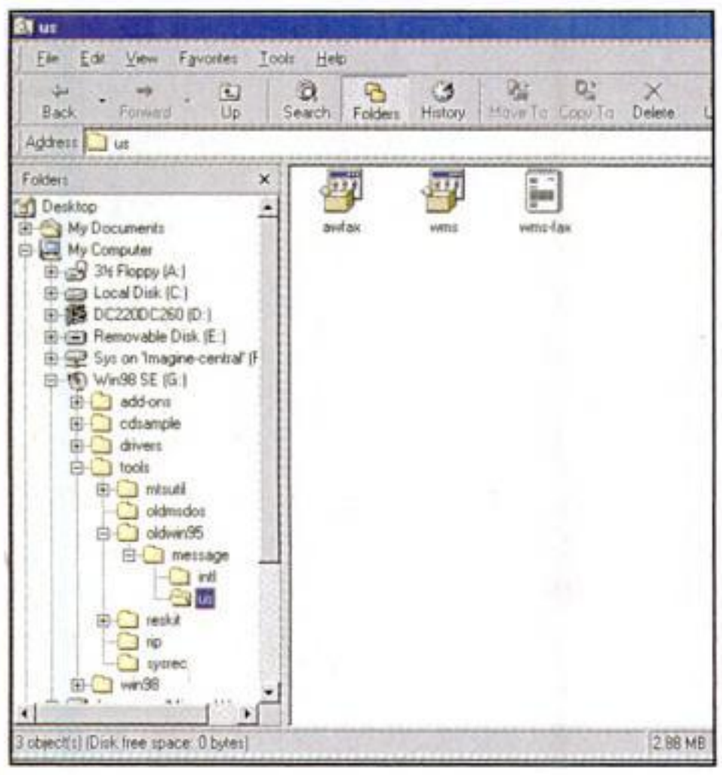
Don't hide the Fax, Microsoft

I had Windows 95 B on my computer, but my wife started taking a college course and needed Windows 98. I reformatted my hard drive, and bought Windows 98 Second Edition full version and installed it, but now I don't have Microsoft Fax. I went to Add/Remove programs and I cannot find it there. Does this new version not have Microsoft fax? HELP!

—Jose Caudillo

Although a routine installation of Windows 98 (either edition) won't install a Fax applet, the files remain on the CD, ripe for the taking. Simply slip the Windows 98 CD into your PC, and get ready to stick it to the man by exploring Tools>Idwin95>Message>Us. Oh, and what do we have here? (Cue Wild and Crazy Guys from SNL.) Faxes!

In order to install the Fax applet, first click on "wms.exe" to install Windows Messaging. When that's finished, reboot, go to the same location, and click on "awfax.exe" to install Microsoft Fax. Reboot again, return to My Computer>Printers, and you'll find Microsoft Fax listed as a print option. To send a fax from a text document, select File>Print, then select Microsoft Fax as the output source. The only drawback to this surreptitious faxing is that Microsoft no longer supports its Fax program, so if it goes haywire, don't go crying to them about it.



Most people think Microsoft took faxing out of Windows 98, but it's right there on the Windows 98 CD.

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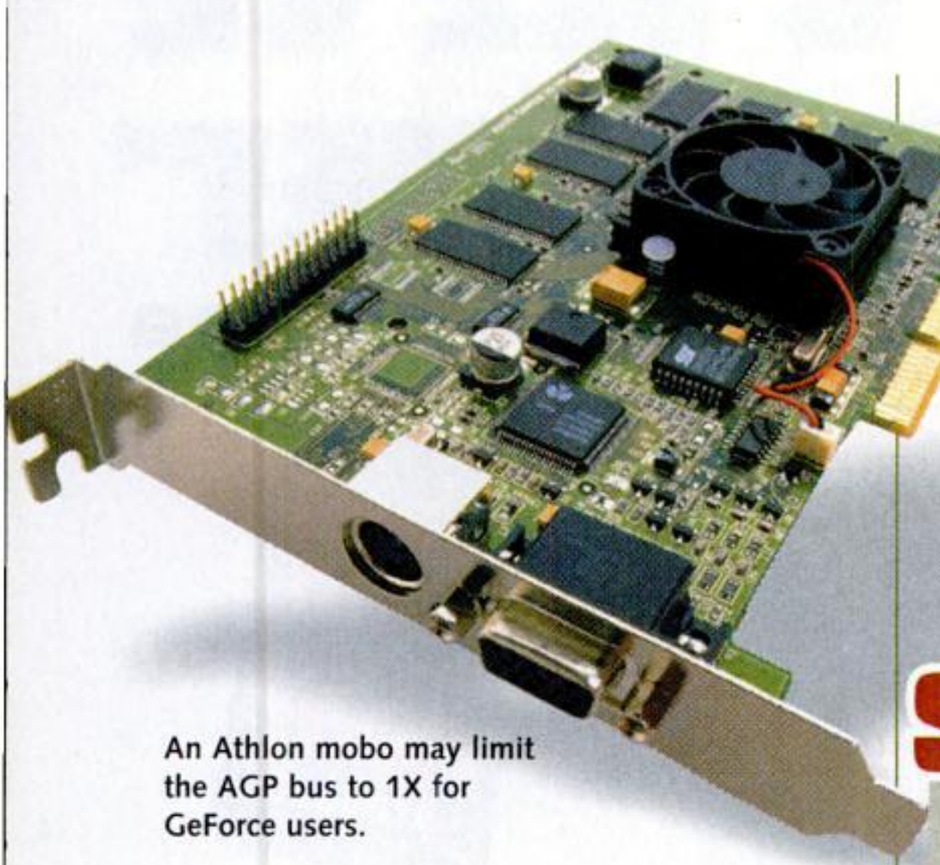

An Athlon mobo may limit the AGP bus to 1X for GeForce users.

AGP 2X VS. 1X

When I run the DirectX Diagnostic Tool from the System Info program, it tells me that AGP isn't supported. I currently run a Diamond Monster Fusion AGP (yes, it's plugged into the AGP port), and a Monster 3D II (also with current drivers). The Fusion drivers and BIOS are the latest I can get from Diamond. My motherboard is a MicroStar 6119 with the latest BIOS update, and I don't see any conflicts of any kind in the Device Manager. I'm running it with a 400MHz Pentium II and I've recently installed DirectX 7.0 and the latest busmastering drivers from Intel. Is there anything I can do? More importantly, is AGP support really worth it? How much of a change does AGP 2x make, anyway?

—Erik Doyle

There is nothing you can do, Erik. The DirectX Diagnostic Tool is telling you that your hardware doesn't support AGP, because it doesn't. Your Monster Fusion is a Banshee board, which means it only runs in AGP 1x mode and cannot access your system memory for texture storage and execution. In effect, it's little better than a PCI card. Cards such as the Monster Fusion can claim AGP support because they meet the AGP 1.0 spec, which translates into an AGP 1x bus and basic AGP texturing (which the Banshee architecture doesn't support).

"Your Monster Fusion is a Banshee board, which means it only runs in AGP 1x mode."

God (or Intel, depending on who you ask) put AGP on this earth to allow more bandwidth to fly between the videocard and the system bus. More bandwidth means more vertex data and more texture info can be fed to your graphics processor, translating into more realistic-looking games. For this, you need an AGP 2.0 compliant videocard capable of transferring data at the rising and falling edges of each AGP clock, for mondo bandwidth increases. In the case of AGP 2x, two 32-bit data chunks are transferred per clock cycle, for a 528MB/sec total bus bandwidth. In AGP 4x, the bandwidth jumps to a whopping 1GB/sec, with four 32-bit chunks of data flying up and down the bus every clock cycle. Compare this to the 133MB/sec of the the sad little Monster Fusion in your system, and you may realize what you're missing. ✹

READERS SHARE THEIR second opinions

HOME REMEDIES

Antivirus vs. Antivirus: fight!

In the October Commport, it reads, "It's totally safe to have two antivirus programs installed on your box at the same time." At my work, I installed *Norton Utilities 3.0* over *Cheyenne* antivirus, to run diagnostics and clean up my drives. When I rebooted, my computer kept locking up and warning me about fatal error exceptions. After I shut off *Cheyenne*, the computer booted properly, and it runs normally now.

—Grant Bonsant

Grant, thanks for sharing. We hadn't tested the theory with *Cheyenne*; we've only installed *Norton* and *McAfee* simultaneously on the same system, but we've never experienced problems with those particular programs. It's most likely that problems arising with *Cheyenne* or *Norton* are due to either program looking at the other's virus definitions and thinking they're viruses, which they obviously aren't.

AOL! AOL!

This is a letter regarding your so-called "AO HELL" letter from the November issue of the magazine. AOL 4.0 and the new AOL 5.0 have settings that enable you to click on a hyperlink, automatically sign on, and go straight to the clicked hyperlink. You do this by setting up AOL as your default web browser (MY AOL > PREFERENCES > ASSOCIATIONS > OK), then setting a stored password for the screen name (MY AOL > PREFERENCES > PASSWORDS > [PUT YOUR PASSWORD IN THE BOX, THEN CHECK THE SIGN-ON BOX > OK) to auto-sign you on.

—Sean Keefe
America Online

Sean was one of many who responded to this one, so I guess it's time to come clean on something—we are not AOL savvy. There, we said it. In our defense, though, we put in a call to AOL technical support and put the question to them, and they said AOL could not automatically dial a connection and open a browser window when a member clicked on a hyperlink.

Speaker popping, round two

In response to Jason Siebert's query about popping in his speakers, your response was right on but leaves out a lot, such as, How old is his house and does it have grounded outlets? Is the wiring copper, copper-clad aluminum, or aluminum?

Things to do would be: Replace faulty receptacles with those that hold the wire with screws, rather than "push fit." Install this style at your computer and anything with motors. Retrofit as many outlets as you can with high-quality grounding wire, especially where high-current is drawn. The above might require running a ground conductor. Where possible, run wire directly to ground connection at "service entrance." Replace light switches, especially where dimmers or fluorescent lighting are utilized. Copper wire is best, with copper-clad a distant second. Aluminum wire was once legal, but I believe that's no longer so. If financially expedient, it should be replaced entirely. Good luck.

—Earl A. Edwards

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-Maximum PC, December '99

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TESTING POLICY

EDITOR'S CHOICE AWARD:

MAXIMUM PC KICK ASS! product

Only 9 and 10 verdicts are even eligible for the coveted Kick Ass award, the mark of PC excellence.

Our product evaluation process is built on down-and-dirty, hands-on testing. All hardware benchmarking is conducted in the *Maximum PC* lab by *Maximum PC* editors, and whenever possible, we use real-world applications to gauge performance. Our final verdicts, which fall on a scale from 1 to 10, are based on both benchmark results and a subjective appraisal of product features.

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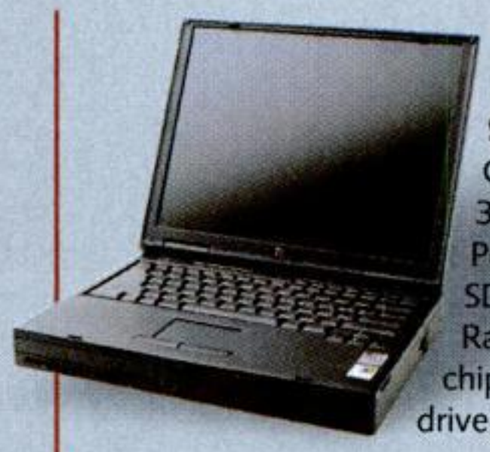
Online Guide to Benchmarking

You can always go to **www.maximumpc.com/benchmarking** for the complete explanation of *Maximum PC*'s benchmarking policies.

How to Read the Benchmarks

Our Dell Dimension test system is used to establish zero points for all desktop benchmarking and as a test bed for individual component evaluation. The Quantex notebook serves the same purpose for notebook reviews. The base system scores represent the average acceptable performance of high-end machines as of 07/99. We will update the mid-point systems every six months with machines from different OEMs.

DESKTOP ZERO-POINT SYSTEM: Dell Dimension XPS T500: P-III 500MHz, 440BX chipset, 128MB 100MHz SDRAM, 32MB TNT2 videocard, 12.7GB 7200rpm UDMA/33 hard drive, 40x (advertised speed) CD-ROM.



NOTEBOOK ZERO-POINT SYSTEM: Quantex I-1410: 366MHz mobile Pentium II, 96MB SDRAM, 8MB ATI Rage LT Pro video chipset, 8GB hard drive, 4x DVD-ROM.

Desktop Systems

BENCHMARKING
REAL WORLD
CPU/MOTHERBOARD bootMark 228 26 228 430
WINDOWS APPS SYSmark 98 official score 204 96 204 300
HARD DRIVE HD Tach MB/sec 15.1 2.2 15.1 28
CD-ROM CD Tach98 drive rating 26.2x 13.8x 26.2x 40.0x
3D RENDERING Newtek Inspire3D sec 441 562 441 320
IMAGE EDITING Adobe Photoshop 5.0 sec 126 202 126 50
DIRECT3D Expendable fps 53.3 0 53.3 120
OPENGL Quake II v3.20 fps 51.5 0 51.5 120
0

The specific score achieved by the system.

The mid-points denote "acceptable performance" and are based on the precise scores achieved by our base Dell and Quantex systems. As we review new systems each month, their benchmark scores will fall either below or above the mark of acceptable performance.

The more a system underperforms the mid-point system, the further into the red its bar moves. The numbers shown at the low-point are the lowest scores we expect to see in any shipping product.

The more a system outperforms the mid-point system, the further into the green its bar moves. The numbers shown at the high-point are the best scores we expect to see in the next six months.

REAL SCIENCE

KICKIN' THE TIRES ON THE LATEST HARDWARE AND TAKIN' THE LATEST SOFTWARE OUT FOR A SPIN

Hardware Photography by **AARON LAUER**

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Falcon Northwest Mach V

THIS BIRD'S WINGS ARE CLIPPED

Money can't buy happiness, and this Falcon proves it.

PLUSES
- GeForce card rules
- Klipsch speakers rock

MINUSES
- Soundcard is old-skool
- 6x DVD-ROM is old-skool, too
- 750 Athlon not much faster than 700MHz version
- Very overpriced

1999 is on the phone, and it wants its Falcon Mach V back.

Don't get us wrong, the Athlon 750MHz-based Falcon posted impressive benchmark scores, but for the money it costs, we expected the system to do the dishes, laugh at our jokes, and, most importantly, blow the doors off the 700MHz Athlon system from Alienware that we tested in December, as well as the 700/733 Coppermine systems we tested in January. But it didn't.

SYSmark is our most demanding, system-wide benchmark, and the Mach V improved on the Alienware's score by only five points—whoop dee friggin' doo. Other benchmark scores were pretty close throughout testing, with the Mach V pulling ahead just barely in five tests, and losing out to Alienware in three others (*Quake II*, HD Tach and CD Tach). Adding insult to injury is the spanking the Mach V suffered at the hands of the 700MHz and 733MHz Coppermine systems from Dell and Micron that we reviewed last month. Both systems rang the Falcon like a gong in bootMark, CD Tach, HD Tach, and Newtek *Inspire*. And both systems cost $1000 less than the Falcon.

The Athlon 750's uninspiring performance isn't entirely Falcon Northwest's fault. Previous Athlons shipped with off-die L2 cache clocked at half the processor speed, which was 350MHz for the 700MHz Athlon. But for the 750MHz version, AMD opted for slower 300MHz L2 cache, running at 2/5 CPU speed. AMD remarked that the 50MHz gain in processor speed is nearly negated in some apps by the slower cache.

In spite of this, some of the blame for the Mach V's luke-warm performance rests on the shoulders of Falcon itself. First and foremost, for $4,500, we expected top-of-the-line every-thing, and that's not what we got.

The DVD-ROM plays movies sufficiently, and they sound amazing pumped through the THX-certified Klipsch ProMedia speakers, but it's a 6x drive, for Pete's sake—that's two generations behind the current king of the hill, Pioneer's awesome 10x DVD-114, which was included in the Alienware. We were also displeased by the inclusion of a Diamond MX300 soundcard, since top-of-the-line would have meant either the Aureal SQ2500 or the Soundblaster Live! Platinum—which was, once again, included in the Alienware. The Optiquest monitor is upgradeable, so we won't harp too much about its bulbous shape, but it's so old, it was featured in systems we reviewed in 1998. We will, however, harp about the fact that no CD-R drive was included.

The Athlon 750 and GeForce card make the Mach V a reasonably solid system, but without these components, we'd swear this machine was configured in mid-1999. Nice try, Falcon, but for this kind of money, we want the best of everything—not reasons to consider our upgrading options right out of the box.

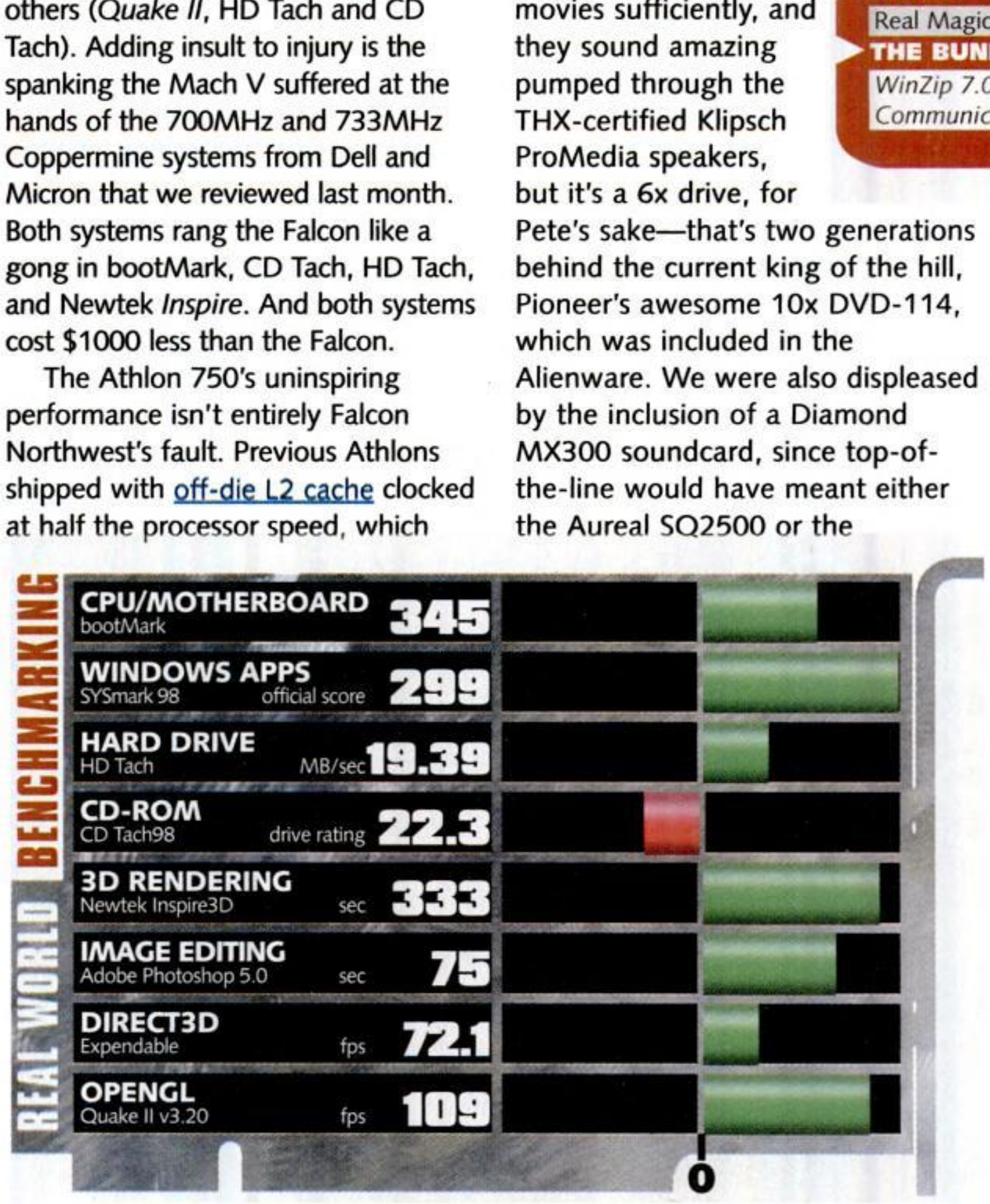
—Josh Norem

UNDER THE HOOD

THE BRAINS

CPU	AMD Athlon 750MHz
L1 Cache	128K (full speed)
L2 Cache	512K (2/5 speed, 300MHz)
RAM	256MB PC100 SDRAM, upgradeable to 768MB
Motherboard	Gigabyte GA-IX with AMD Northbridge and Southbridge chipset
Drive Bays	Three 5.25-inch (two open), four 3.25-inch (one open)
I/O Ports	One parallel, two serial, two USB, two PS/2, S/PIDF, Stereo out, TV-out, VGA-in, VGA-out
DISPLAY	
Video	Guillemot 3D Prophet with nVidia GeForce, 32MB SDRAM
Monitor	Optiquest V95 19-inch viewable, 0.26mm dot pitch
Res/Refresh	1600x1200/72Hz@32-bit
STORAGE	
Hard Drive	Western Digital 27.3GB, 7200-RPM UDMA/66
DVD	Toshiba 6x SD-M1212
Removable	Iomega ZIP 100MB Internal
Fax/Modem	U.S.R. 56K ISA Modem
SOUND	
Sound	Diamond Monster MX300 A3D 2.0
Speakers	Klipsch Pro Media v.2-400
OTHER	
	Real Magic Hollywood+ MPEG decoder
THE BUNDLE	
	WinZip 7.0 | *Gamespy* | *Roger Wilco* | Netscape *Communicator 4.7* | McAfee *Virus Scan 4.03 OEM*

BOOT **0:07** DOWN **1:53**



MAXIMUM PC VERDICT

Price $4,500 with monitor, $4,000 without monitor
Company Falcon Northwest
Phone 800.258.6778
URL www.falcon-nw.com

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EXPANSION NOTES

The Falcon's got the tightest wiring we've ever seen, which should make upgrades painless. Three PCI and one ISA await your next move.

EXPANSION MAP

AGP Videocard
PCI Soundcard
PCI Free
PCI MPEG decoder
PCI Free
PCI/ISA Free
ISA Modem

IROS

00 System timer	**09** Hollywood+
01 keyboard	**10** IRQ holder
02 Interrupt controller	**11** GeForce
03 COM 2	**12** Vortex AU8830
04 COM 1	**13** PS/2 mouse
05 SB16 emulation	**14** Numeric data proc
06 Floppy disk	**15** Bus master control
07 LPT1	**16** Secondary IDE controller
08 system CMOS	

DMAS

00 SB16 Emulation	**03** SB16 Emulation
02 Floppy	**04** DMA Controller

Athlon 750–50=700 AMD defanged the 750 by opting for slower L2 cache that runs at 300MHz. With the L2 losing 50MHz cache speed, the 750MHz CPU is barely faster than a 700MHz chip with 350MHz L2.

Wiring tips from the pros Internal wiring is better than most could do themselves. They even ran the audio cable from the DVD-ROM down through the empty DIMM slot, and bundled it up nice and neat.

Honey, there's alien goo in the case! That's actually a silicon compound used to ensure nothing becomes unplugged during shipping. It's also a good example of the attention to detail shown by Falcon Northwest.

Powered by Athlon Falcon Northwest switched to AMD Athlon processors last year, helping solidify the chip's reputation as the gaming CPU of choice.

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Quake III: Arena

COME GET SOME

Quake III is about one thing and one thing only—deathmatch. If you buy this game knowing that, you will not be disappointed. If you're looking for great teamplay, advanced Bot AI, or a game that'll run on your ho-hum PC, we recommend you turn to page 87 for a game that'll make you much happier. But, if you're a deathmatch fan, it doesn't get any better than this.

The third installment in the *Quake* series marks a return of everything good from previous games, with a polish and shine that's technologically amazing. The same weapons are back. The "you've just entered hell" architecture and blood-soaked gameplay are here, too. The game's levels also look stunning, thanks to the *Quake III* engine—though we were disappointed by the lack of variety in the included maps.

Quake III delivers rapid-fire deathmatch in some of the most unholy arenas every to appear on a PC.

THE SPECS

3D GRAPHICS SUPPORT
OpenGL

3D SOUND SUPPORT
A3D | DirectSound

MULTIPLAYER
TCP/IP | IPX | LAN | Mplayer

TOTAL PLAYERS
32

PLUSES
- Amazing graphics
- Fast action
- Level design is excellent

MINUSES
- Teamplay options are lacking
- CTF maps are too small
- über system required

Although early screenshots of the game showcased levels replete with gaping mouths, breathing walls, and writhing trees, the final product is very reminiscent of *Quake* and *Quake II*; so much so, it's disappointing. Id is certainly capable of producing mind-bending maps full of particle effects and other next-gen features, but it says most of its more ambitious ideas incurred such a huge frame rate hit due to polygon counts, they weren't worth implementing. The final product includes a startlingly small collection of maps—26 to be exact—that are divided across three categories: gothic, industrial, and outer space. Acceleration pads (a.k.a. bouncy pads) adorn almost every map, nicely directing movement and maintaining fast gameplay.

The Bots are so dumb, they chat during battles, even when being shot at.

And fast it is, assuming you have a monster PC capable of handling the amazing visuals that the *Quake III* engine delivers. Curved surfaces are the most-hyped feature of id's newest 3D engine. They're used sparingly throughout the game's maps, but achieve a very subtle, organic feel that makes even satanic dungeons feel warm and cozy. Much more prevalent and visually appealing are shaders (advanced texture pointers), which are used to create animated textures on player models and walls. In fact, the *Quake III* engine is so far ahead of its time, nothing short of an Athlon/P-III 700 tied to a DDR GeForce card will be able run it, with everything turned on, at a reasonable rate.

The purpose of the game is online deathmatch, but id provides Bots as well, so you can hone your skills before making the plunge onto public servers. Unfortunately, the Bots aren't especially intelligent opponents; they chat annoyingly in the middle of firefights, completely ignore dropped weapons, and always cluster at the same location in maps. The higher-skilled Bots make up for this dim-witted, sorority-girl behavior by cheating with inhuman accuracy. Team deathmatch and Capture the Flag options are also available for Bot play, but they're so poorly implemented, we wonder why id even bothered to include them. Coordinating the Bots requires you to learn pages of commands, the four Capture the Flag maps are far too cramped, and team deathmatch is still that—deathmatch.

id makes no apologies for *Quake III*'s minimalist approach, insisting the game is the final word on deathmatch, and nothing more. But out of the box, *Quake III*'s half-baked team options and weak AI programming imply that the game's development was rushed. Quake III's graphics are amazing for sure, but with its focus on deathmatch, we're a tad underwhelmed.

—Josh Norem

MAXIMUM PC VERDICT

Price $40
Company id Software
Phone 310.255.2050
URL www.quake3arena.com

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Unreal Tournament

MUST...PLAY...MORE...

While *Unreal Tournament* ditches the single-player adventuring of the original *Unreal* for pure multiplayer action against Bots and online foes, its 3D engine and gorgeous graphics are as familiar as ever. If you give *UT* some time, you'll find that it answers every nagging problem people complained about in the first go-around. You get enhanced weapons, player models, sounds, level design, and netcode for multiplayer. Everything in *UT* that's left over from *Unreal* has been tweaked, completely redone, or improved.

The most noticeable improvements are in weaponry, which was previously too pansy-ass to invoke any "I own you!" war cries during the heat of battle. The best weapons of the original arsenal have been improved with louder reports and more bombastic explosions, and they accompany a slew of new, ingenious armaments. Weapon balance is spot-on, allowing you to kill any combatant, using any weapon, within a matter of seconds. Some may complain the weapons are too powerful, but they all require skill to use, and the really powerful ones—such as the rocket launcher and nuclear warhead launcher—are in short supply on most maps.

Gameplay is incredibly smooth both online and off, thanks to improvements in Direct3D and networking code that Epic has been working on since the release of the original game. Playing *Unreal* under Direct3D used to be so choppy, it was maddening. But after building numerous patches for improved texture management and caching, Epic finally got it right. Of course, a Glide card from 3dfx is recommended for the fastest frame rates, but we tested *UT* on two separate Diamond Viper TNT2 Ultra cards, and gameplay was silky smooth on both.

Raynor (Red Base) Hey! Same team!
Dnmacus (Red Base) I'm on your team, you idiot!
42
91
Name: Kosak
The enemy has your flag, recover it!
You have the flag, return to base!

Blood-soaked battles are Unreal Tournament's trademark.

Anyone who's played *Unreal* online knows the pain of packet loss, but that's also been rectified in *UT*. The networking code is now very polished and on par with id software's code, which has long been heralded as the best in the business. You may not even want to go online, however, thanks to some of the most lifelike Bots we've ever experienced. Programmed to play like real humans, these Bots miss shots, anticipate your movements, taunt you after a frag, and even hop around like *Quake* players. In fact, one *Maximum PC* staffer played Capture the Flag online for at least half an hour before he realized he was playing against all Bots, and was the only human on the server. If the server admin had changed the Bots' names from their default settings, the editor would have never known that he was being schooled by unfeeling subroutines.

Any game that lets us run around with a chainsaw gets a Kick Ass.

The Bots have eight difficulty levels, and can auto-adjust to your skill level. We found playing against them to be just as fun (and much more orderly) than playing against humans—Bots always follow your orders, don't stack teams, and always balance offensive and defensive capabilities. The Bots' cooperation also factors well into team play, which is one of *UT*'s strongest points. In addition to Capture the Flag, you get two new styles of team play: Assault, where one team plays offense and another plays defense, and Domination, where teams fight to maintain control of points on a map. Assault was our personal favorite, and promotes bench-clearing brawls when one team is close to achieving the map's objective.

Unreal Tournament has far exceeded our expectations, and will certainly make *Quake 3: Arena* sweat in its bid for gamers' hearts and wallets. We say be like Switzerland—play both sides.

—Josh Norem

PLUSES
- Five modes of gameplay
- Destructive, beefy weaponry
- Bots are amazingly lifelike

MINUSES
- Multiplayer newbies might miss single-player adventuring
- Font used on the box is all wrong

THE SPECS

3D CARD SUPPORT
Glide | OpenGL | Direct 3D

3D SOUND CARD
A3D | DirectSound

MULTIPLAYER
TCP/IP | LAN

TOTAL PLAYERS
16

MAXIMUM PC VERDICT

Price $55
Company GT Interactive
Phone 800.610.4847
URL www.unrealtournament.net

9

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Dell Inspiron

Too much of a good thing

PLUSES
- Fast, with a big hard drive
- MegaBay expansion is very cool

MINUSES
- Holy crap, it's expensive
- Holy crap, it's heavy
- 3D playback could be better

The Dell Inspiron 7500 is the first notebook we've gotten our hands on that contains Intel's new Coppermine CPU. While it chewed through our benchmarks like a pissed-off Rotweiller, we couldn't help but feel disappointed with its overall performance. Once you get beyond the Coppermine proc and extensive features, the Inspiron is a behemoth packed with functionality, but short on practicality.

For starters, the screen is too big. At 15.4 inches, it's a treat to look at (though the screen we reviewed had two dead pixels), but when the machine is shut, the edges of the monitor hang over the sides and rear of the rest of the box. This makes the whole notebook awkward to carry and aesthetically clumsy. The trackpad delivers responsive, fully adjustable sensitivity, and the keyboard feels natural, but the case design is blocky and boring. Sure, power and features always come first, but for four grand, we want some sex appeal, too.

The Inspiron is a racehorse and a workhorse, but it's got all the charm of a big, old Chevy Nova.

The 7500's software DVD playback was above average, but the sound was tinny and unimpressive, and suffered extensive distortion during loud movie scenes. The Inspiron pooped out 14.4fps in the *Expendable* test, and overall Direct3D performance from the ATI Rage Mobility P chipset was decidedly uninspiring; Dell would have been smarter to go with S3's new Savage 4 mobile chipset. However, the Inspiron did turn in an impressive 27.7fps in our OpenGL *Quake II* benchmark.

Application performance is clearly the 7500's forte. It dusted every notebook previously tested in every application benchmark but the *Photoshop* test, where it laid down scores that were only average. It battered the *SYSmark* test with an impressive 214, and positively creamed all previous bootMark scores for notebooks. Never before have we seen such raw, impressive horsepower from a notebook, which makes sense when you consider that the Coppermine chip, when combined with Intel's 440 BX AGP chipset, puts the Inspiron on the same playing field as some desktop systems.

Other niceties include a battery that lives up to its estimated four-hour lifespan—it allowed us to watch two DVD movies in a row before needing a recharge. A whopping 22GB hard drive means you'll have plenty of room in which to grow your gallery of "tasteful Internet erotica." And then there's the 7500's best feature: the MegaBay. When the machine is plugged in, you can remove the battery and use the vacated MegaBay to plug in two additional peripheral devices, for a total of four. It's nice to have those slots available for extras like an optional CD-R, a Zip drive, a smaller battery, or a second hard drive (as if you'd need one).

Yes, the Inspiron is a racehorse and a workhorse, but it's got all the charm of a big, old Chevy Nova. The thought of running through an airport with this monster ripping at our shoulders makes us cringe. We want functionality, but to cram everything under the sun into a box and call it a notebook isn't the way to go. Hopefully, Dell's next Inspiron will keep the functionality, but slip it into a smaller and lighter package, for those of us who remember the days when you could bring a notebook onto a plane as a carry-on.

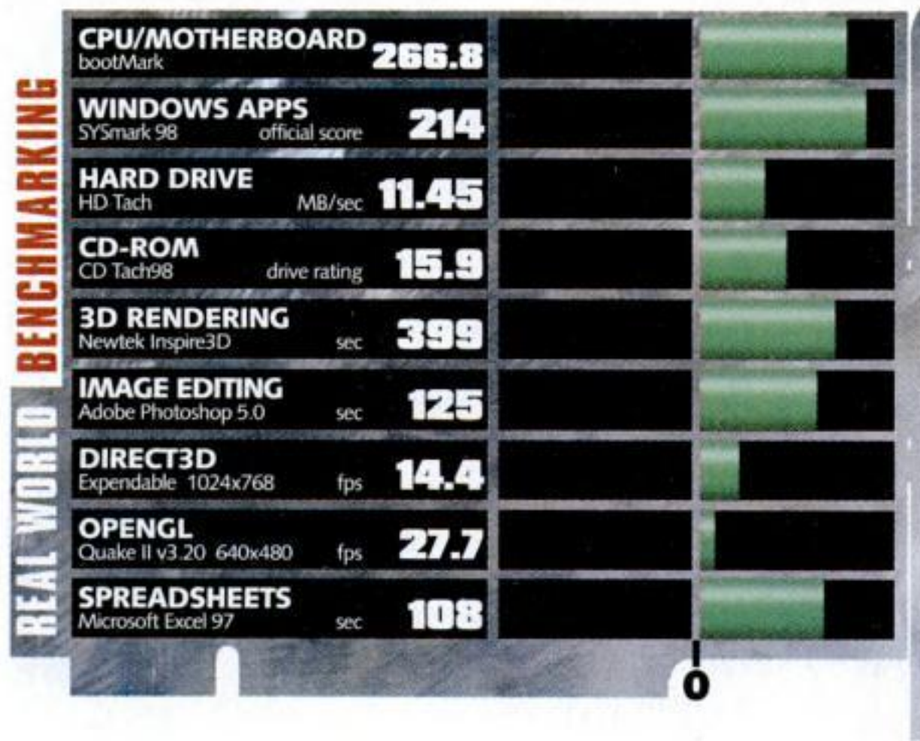
—Geoffrey Visgilio

UNDER THE HOOD

THE BRAINS	
CPU	500MHz Intel Mobile Pentium III
RAM	128MB SDRAM (expandable to 512MB)
I/O Ports	Dual PC card USB I PS/2 I VGA/S-video out I Parallel I Serial I IrDA I Mic-in I Headphone-out I Line-out I Docking station
Modem	Built-in 56.6Kbps modem
DISPLAY	
Videochip	ATI Rage Mobility P with 8MB of SGRAM
Display	15.4-inch active-matrix
Res/Depth	1280x1084/32-bit
STORAGE	
Hard Drive	IBM 25GB DARA-225000
DVD-ROM	ToriSan 6x DRD-U624
SOUND	
Sound	ESS Maestro-2E software wavetable/FM synthesis
Speakers	0.5W Side-mounted stereo with SRS
TIPPING THE SCALES	
Lap Weight	8 lbs, 6 oz
Carry Weight	9 lbs, 5 oz

BOOT 0:55 DOWN 0:04

REAL WORLD BENCHMARKING



MAXIMUM PC VERDICT

Price $4,301
Company Dell
Phone 800.915.3355
URL www.dell.com

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Copyrighted material

Half-Life: Opposing Force

EXPANSION PACK FAILS TO LIVE UP THE HALF-LIFE NAME

Last year, we awarded *Half-Life* a perfect 10 verdict, as well as Game of the Year honors, so when the *Opposing Force* expansion pack arrived in our office, we declared a *Maximum PC* holiday, ripped open the packaging, and began to play. We couldn't wait to return to the Black Mesa Research Facility to reduce more aliens to their intrinsic elements, and after watching the killer opening sequence, we let out a collective cheer—*Half-Life* has returned!

But the excitement quickly wore off as we began to aimlessly wander around Black Mesa, waiting in vain for something exciting or anything remotely *Half-Life*-ish to occur. Maybe we're naïve, but we expected more from the expansion pack—the same sophisticated puzzle solving, the same compelling plot twists, the same enemy ambushes that caused skid-marks. But that's not what we got.

We've got hostiles! Op For's focus on teamwork adds an interesting twist to single-player action.

In this mission pack, you play as a Marine. The game starts with a hilarious training mission called "Boot Camp," where a drill sergeant straight out of *Full Metal Jacket* incessantly asks what your "major malfunction" is. After graduation, you're flown to the Black Mesa compound to "contain" the mess started by Gordon Freeman's resonance cascade in *Half-Life*. As expected, aliens show up and blow your Osprey transport plane out of the sky, leaving you alone and in search of your platoon.

While the otherwise blah game picks up steam toward the end, it's not enough to make you want to play 24-hour marathons like the original did. Luckily, long playing stints won't be necessary; *Op For* is so short, any skilled gamer will be able to finish it in one sitting.

What do they put in the water at Black Mesa?

The game does have a few highlights; we particularly like the new weapons and opponents. *Op For* starts off with two new default weapons—a pipe wrench and a combat knife—and eventually lets you play with a chain-fed automatic rifle, a Desert Eagle pistol with laser sight, and even a shoulder-mounted animal that fires biological rockets. The new bad guys are awesome, too, and are much harder to kill than those in *Half-Life*, because they wield more powerful weapons and can take more damage than the sissy aliens and houndeyes of the first game.

Another new feature is the ability to team up and fight in squads alongside your fellow Marines. This is a blast during the few scenarios in which it occurs. NPC intelligence is excellent, as expected, and you can cajole engineers to cut through doors and medics to recharge your health.

While single-player action snores, multiplayer action rocks. *Op For* includes deathmatch maps created by industry all stars, and three new *Team Fortress Classic* maps that were the winning entries in a contest sponsored by Valve. Valve hasn't released maps in almost a year, so it's fun to have some new "official" maps, models, and weapons to play with.

It's a shame *Op For* doesn't kick as much glute as we'd hoped, and trust us, we wanted it to rock so bad, we're still in denial over its mediocrity. But, we have to be honest with our readers and ourselves: *Opposing Force* is like a blow-up doll—it's fun for about 15 minutes, but nothing like the real thing.

—Josh Norem

PLUSES
- Destructive new weapons
- Boot Camp training course is a riot
- Multiplayer maps are excellent

MINUSES
- Boring gameplay
- Plot is weak
- Too short

THE SPECS

3D CARD SUPPORT
OpenGL | Glide | Direct 3D

3D SOUND CARD
EAX | A3D

MULTIPLAYER
TCP/IP | IPX | Modem | LAN

TOTAL PLAYERS
32

MAXIMUM PC VERDICT

Price $40
Company Gearbox Software
Phone 800.545.7677
URL www.sierrastudios.com

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USB CD-RW 411 4U

PLUG-AND-PLAY CD RECORDING HITS YOUR DESKTOP

It took CD-RWs some time to make the jump to USB, but since CD burning has caught on fire like Latin pop music, their timing is perfect. We took a look at two drives from CD recording titans Hewlett Packard and Sony. Both are spec'd to burn at 4x (600k/sec), and offer 4x rewrite speeds and 6x read speeds (remember, read speeds are bottlenecked by USB's throughput limit). Without spoiling the chilling finale, we'll say only that USB burning actually works as advertised. But if bad CPU utilization scores get your panties in a wad, you'll want to stick with SCSI.

—Josh Norem

Sony Spressa USB Plus 4x/4x/6x

PLUSES
- Reliable burns, even during gaming
- Audio software is top-notch
- Mac software included

MINUSES
- CPU utilization is too high
- Can't auto-burn MP3s

THE SPECS

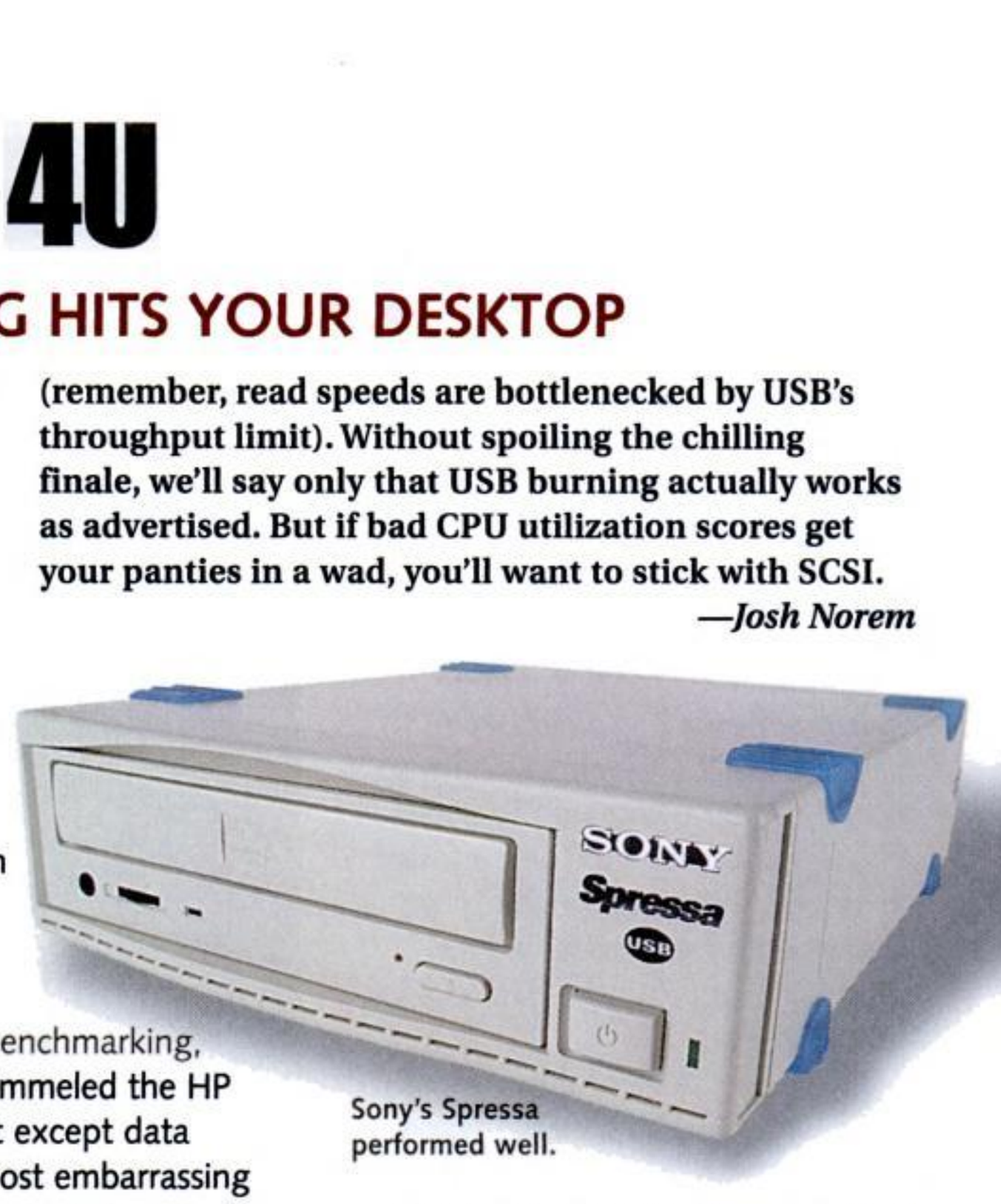
READ SPEED	6x
RECORD SPEED	4x
REWRITE SPEED	4x
BUFFER	2MB
BUNDLE	*CD Extreme with Hyperdrive* I Spressa *Play & Record* I *CD Discribe for Mac* I *CD Stomper Pro*

In the past, we've been impressed by Sony's CD-Rs, and the Spressa USB Plus maintains the Sony tradition. The drive's official name is the CRX100E/X2. Sound familiar? Indeed, this is the same Sony drive that received a 9 in our February 1999 issue, but this iteration boasts a USB interface.

The drive performed close to its advertised specs, reliably recording everything from audio to data at exactly 4x, and delivering a CD Tach read rating of 5x. Typically, CAV drives can read data faster as their lasers move to the outside edges of a disk, but we found that the read speeds of both USB drives tested this month were consistent regardless of disk location.

In real-world benchmarking, the Sony drive pummeled the HP drive in every test except data extraction. The most embarrassing defeat was in mixed-mode CD copying—the Sony drive was more than two minutes faster than the HP drive.

Sony's software package, *CD Extreme*, is very intuitive and allows for everything from audio extraction to two-click CD copying. A music player is also included. However, since Sony is in the music business, the software stopped short of providing CD audio-to-MP3 conversion tools.



Sony's Spressa performed well.

The worst news we have to report is the drive's CPU utilization: 80%. Don't let that scare you off, though: Even with a USB mouse plugged in and a game of *Half-Life* in progress, the drive refused to make a coaster.

MAXIMUM PC VERDICT

Price $330
Company Sony
Phone 800.352.7669
URL www.sony.com

9

HP CD-Writer Plus 8200e 4x/4x/6x

PLUSES
- Faster reads than Sony drive
- Reliable burns

MINUSES
- Slower than it should be

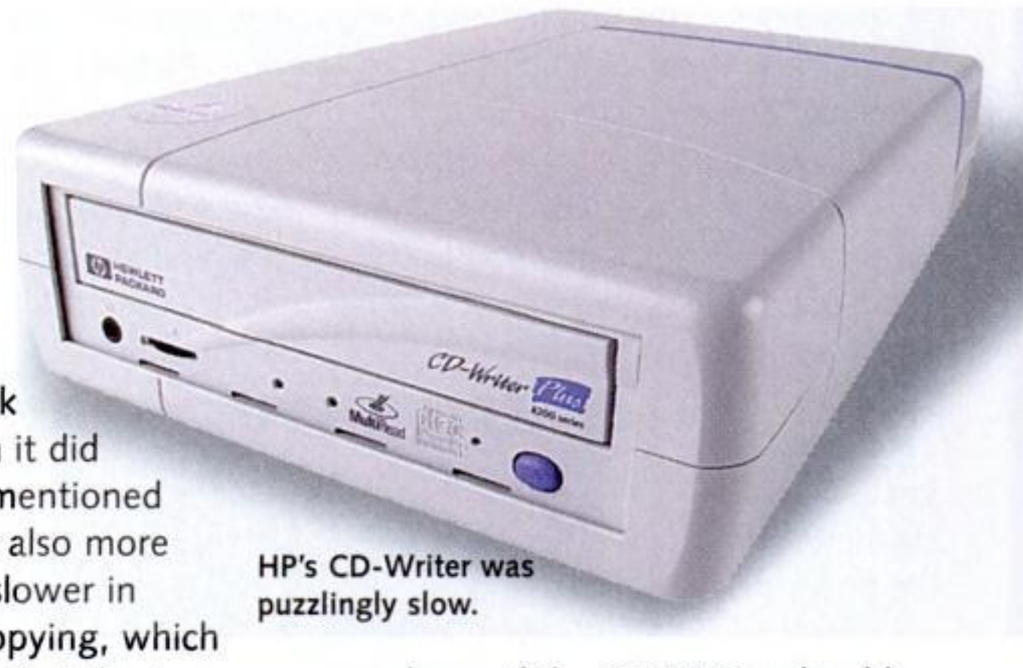
THE SPECS

READ SPEED	6x
RECORD SPEED	4x
REWRITE SPEED	4x
BUFFER	2MB
BUNDLE	Adaptec *Easy CD Creator 3.5c* I Adaptec *Direct CD* I *Filingcentral* I *Neato CD labeler* I *Corel Print Office* I Broderbund *Print Shop Multimedia Organizer Professional*

Though the CD-Writer Plus generally performed slower than the equally spec'd Sony drive, it boasts lower CPU utilization scores than the Sony, and slightly faster read speeds.

The HP drive edged out the Sony by a hair in CD Tach, reeling off a 6.1x average read speed. CPU utilization was also lower than the Sony's by 20%, but at 60%, it's still ridiculously high. We put the HP drive though the same USB mouse/*Half-Life* torture test that we forced the Sony to endure, and it also passed with flying colors. But, overall, the benchmarks show the HP to be generally slower than the Sony. The exception was in extracting data to a hard drive, where the HP drive was one minute quicker. Audio extraction proceeded at 4x, but, thanks to *Easy CD Creator*'s sluggishness, it took slightly longer than it did with the Sony. As mentioned above, the HP was also more than two minutes slower in mixed-mode CD copying, which is odd, considering that the two drives have identical specs.

We blame the software for the discrepancy—anyone who's familiar with CD burning knows that *Easy CD Creator*, while easy to use and great for newbies, is certainly not the fastest utility out there. The software performance is the Achilles heel of what is otherwise a solid drive. Anyone considering a purchase of the CD-Writer should look into third-party software such as Ahead Software's *Nero* or Padus' *Diskjuggler*.



HP's CD-Writer was puzzlingly slow.

MAXIMUM PC VERDICT

Price $350
Company Hewlett Packard
Phone 800.752.0900
URL www.hp.com

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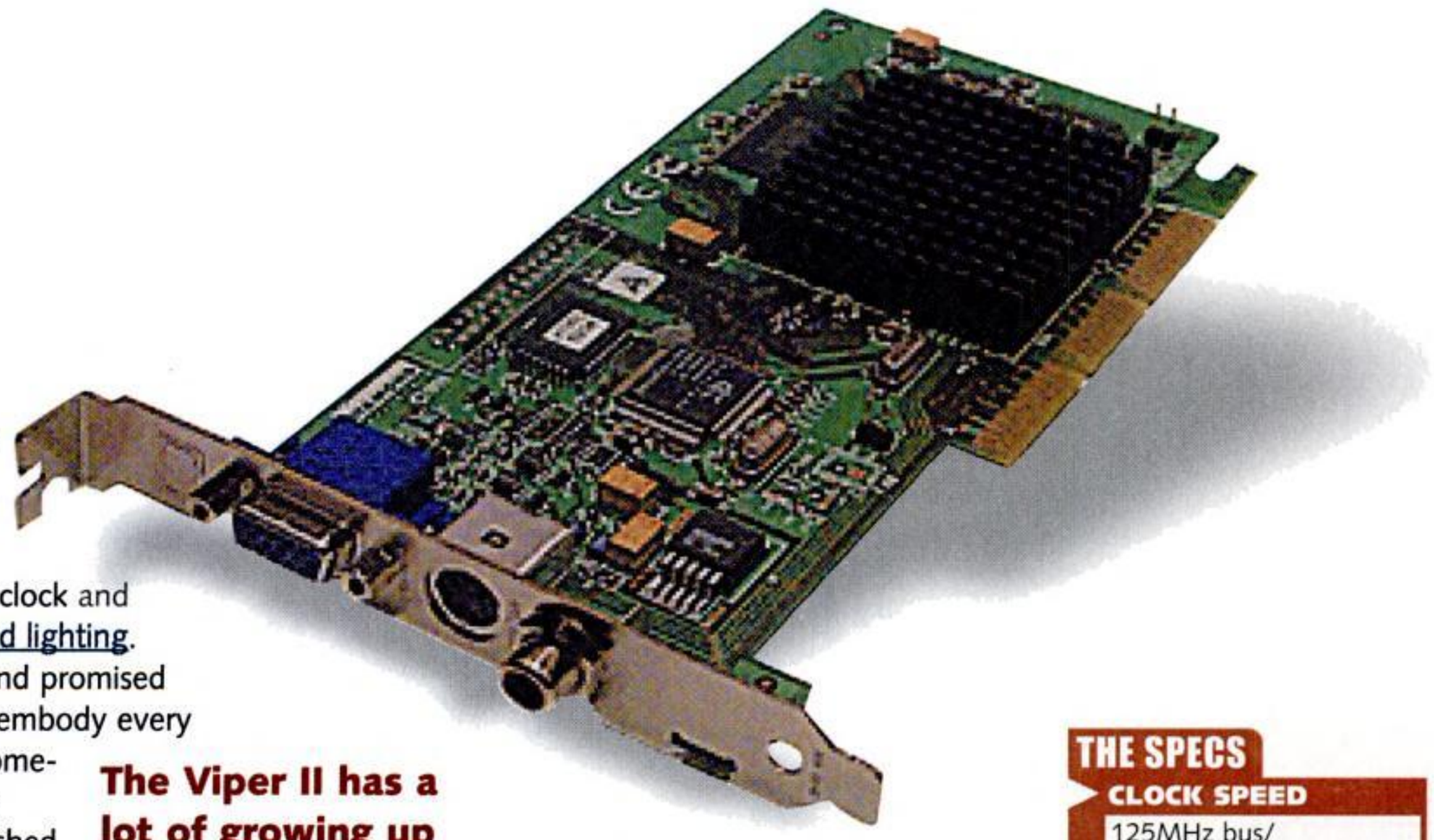
Viper II

PROBLEM CHILD



The Viper II had so much potential. Announced last fall, the first offspring from the union of S3 and Diamond was originally spec'd with an ultra-fast 175MHz clock and support for hardware transform and lighting. Like proud parents, S3 and Diamond promised their bouncing baby board would embody every feature known to 3D-kind—but something happened on the way to the delivery room. The Viper II was rushed to hit a premature due date, forcing Diamond to drop the clock speed and pull an ATI by releasing poorly written drivers. The final product's core clock speed is a mere 125MHz, and the shipping drivers have no DirectX 7.0 support, so while hardware T&L is supported by the graphics processor, that support is not currently exposed by the drivers. It's clear that the Viper II has a lot of growing pains ahead of it.

The Viper II has a lot of growing up to do if it wants to play with the Voodoo5 and GeForce big boys.

Built around S3's new Savage 2000 graphics processor, the Viper II has dual pixel pipelines pumping through its veins, each of which is capable of cranking through two textures per clock cycle. The result is a card that's designed to power through hot-and-heavy multitextured effects, such as *Quake III*: *Arena*'s animated textures. The Savage 2000 is also the first graphics processor to hit the 0.18 micron mark, allowing S3 more headroom to aggressively push both chip complexity and clock rates, which the company plans to do this spring with a faster version of the card.

In spite of this, the Savage 2000 is, at best, a "me-too" product; nVidia's GeForce arrived before the Savage 2000, and outperforms it in every category but multitexturing fill rate. While the S3 guys are boning up on DirectX 7.0 driver development, nVidia already has a processor that knows the API like the back of its hand.

The GeForce supports all the new DirectX 7.0 features, including hardware T&L; the Savage 2000 doesn't. The GeForce has a fully functional OpenGL ICD; the Savage 2000 doesn't. The Viper II *does* have a healthy fill rate going for it, and this certainly shows in our OpenGL benchmarks. Its OpenGL scores surpassed those of both the Creative Labs Annihilator and the Guillemot 3D Prophet GeForce boards that we reviewed in our December issue (though it's worth noting that it didn't surpass the DDR-powered Annihilator Pro's scores, which helped the Pro win a 9/kickass).

But, Diamond shouldn't start handing out celebratory cigars just yet. There's no way to enable or disable OpenGL V-Sync in the Viper II's current drivers. Since we always test with V-Sync enabled, that translates into a questionable performance gain; if we can't verify that V-Sync is actually disabled, we can't verify whether or not the Viper II is rendering ahead of the monitor's refresh rate, and therefore gaining an advantage. The drivers do supply a V-Sync toggle on the Direct3D side; of course, in Direct3D games, the Viper II doesn't rise above TNT2 Ultra performance levels. Blame it on the immature drivers, since the hardware should be capable of much more.

The Viper II's TV-out support isn't anything special, but video playback image quality certainly is—we didn't notice any color dithering. In our DVD playback test, however, the hard drive displayed a constant flurry of activity, making us doubt whether the software DVD player actually takes advantage of the Viper II's MPEG-2 motion compensation support.

It's very hard to recommend the Viper II as it is now, but it's even tougher to recommend that you rely on the new S3/Diamond conglomerate to rear a set of drivers that can turn the Viper II into a productive member of society.

—Sean Downey

THE SPECS

CLOCK SPEED
125MHz bus/ 143MHz memory

RAMDAC
350MHz

AGP SUPPORT
AGP 4x

LOCAL MEMORY
32MB SDRAM

MAX 32-BIT RESOLUTION
1920x1080

MAX 16-BIT RESOLUTION
2048x1536

MAX 1600X1200 REFRESH RATE
85MHz

BUNDLE
Win9x drivers | NT drivers | Zoran *SoftDVD* | Acclaim *TrickStyle*

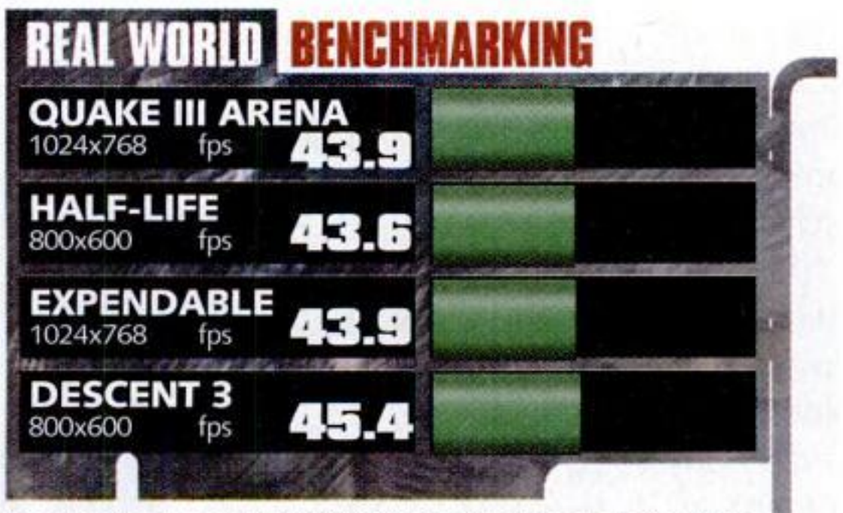
PLUSES

- Powerful Savage 2000 quad-texturing engine
- Strong OpenGL performance
- Versatile InControl Tools 99
- Hardware has kick-ass potential

MINUSES

- Immature drivers
- No DirectX 7.0 support
- Weak Direct3D performance
- Sluggish DVD playback

REAL WORLD BENCHMARKING



Benchmarked on our Dell 500MHz Pentium III test system using version 1.09 of the Diamond drivers. K7 benchmarks are posted online. As always, V-Sync is enabled.

MAXIMUM PC VERDICT

Price $200
Company S3/Diamond
Phone 800.468.5846
URL www.diamondmm.com

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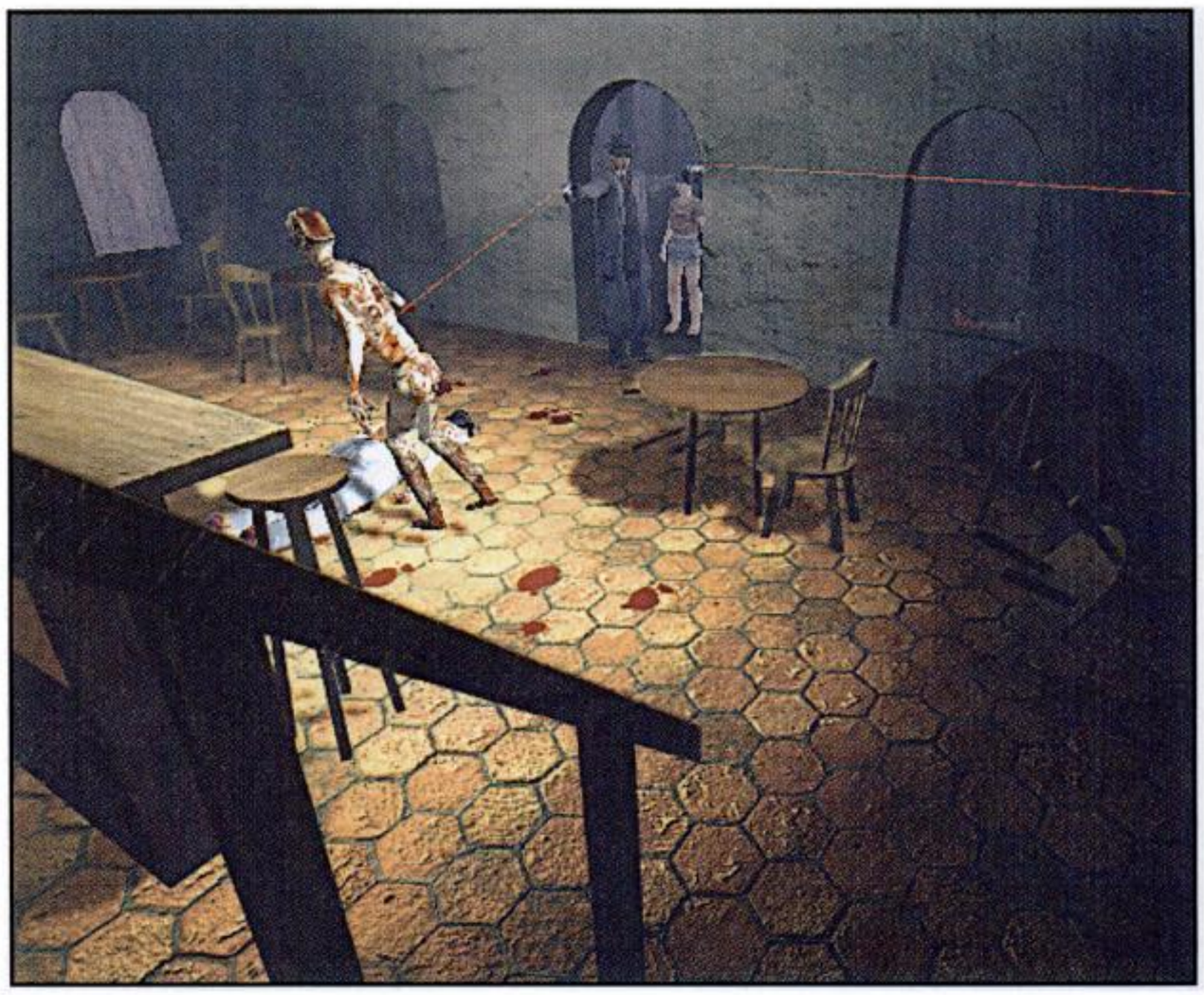
Nocturne

GRAPHICS SIZZLE, TERROR FIZZLES



Nocturne is one of the prettiest titles to tickle our eyeballs this gaming season. But the one thing promised by its extensive advertising campaign and spooky packaging is the one thing it never delivers: a single moment of heart-stopping terror.

Set in the late 1920s and early 1930s, *Nocturne* centers around a top-secret government organization called Spookhouse, formed by President Teddy Roosevelt to investigate and stop dangerous paranormal activity. You play "The Stranger," a dark man in a long coat and sunglasses who specializes in hunting monsters. Therein lies the game's plot: Kick monster heinie.

THE SPECS

3D HARDWARE SUPPORT
Direct 3D

3D SOUND SUPPORT
EAX | DirectX

MULTIPLAYER
None

PLUSES
- Amazing graphics
- Great environmental effects, with realistic shadows and lighting
- Great sound

MINUSES
- Too dark
- Lofty system requirements
- Bad camera transitions
- Interface can be annoying at key moments
- Just not scary

Graphically, *Nocturne* is absolutely breathtaking; it takes a hard-core machine to even do the visuals justice. The recommended system—trust us, you don't even want to bother with the minimum requirements—is a 400MHz CPU, 128MB of RAM, a Matrox G200/G400 or nVidia TNT/TNT2 videocard, and a full gig of space on your hard drive. If you've got these goods, you won't be disappointed with the game's 3D graphics. With 32-bit color support and meticulous attention to detail, *Nocturne* has some of the coolest environments and lighting effects we've ever seen. The carnage is non-stop and vivid, and a realistic environment engine delivers rain, fog, and shadows that are so realistic, you'll feel like you're in an *Evil Dead* movie.

How many zombies do I have to kill to get a drink in this place?

So, what's wrong? For starters, *Nocturne* is too damned dark. When you first run the game, a start-up screen provides monitor calibration settings to help you achieve a better visual experience, and even advises you to turn off all the lights in the room. While the calibration help is appreciated, we have to take issue with the "lights off" advisory. It helps foster a spooky atmosphere, but it's not practical. What if you want to play during the daytime, or in a room with unremittent lighting?

***Nocturne* pits you against the undead. This guy's about to meet his maker for a second time.**

Nocturne also suffers from gameplay issues that border on infuriating. First on our list is the run-jump maneuver, which is almost impossible to pull off with the game's *Resident Evil*-style camera angles and The Stranger's inability to leap at the proper angle at the right time. After watching him plummet to his death 10 times in a row, the game stops being challenging and starts being frustrating.

But, the worst disappointment is that *Nocturne* quickly abandons any semblance of a plot, turning into a carnage-fest that totally lacks the foreboding and terror the game is purported to have. Mowing down monsters with a shotgun is always fun, but not exactly our idea of suspenseful gameplay. Solving *Tomb Raider*-esque puzzles to reach a supposedly horrifying epiphany isn't all that creepy either, and some of the dialogue is downright corny (the priest in the second adventure sounds eerily like Ned Flanders of "The Simpsons"). Most monsters are more ridiculous than scary; witness the imps that look like red Smurfs and giggle when they attack you.

Nocturne lacks the shocking surprises, plot twists, and creative camera angles of *Alone in the Dark*, the game that started the entire genre, and it isn't half as fun as the *Resident Evil* series. It's sad, too, because you can see what *Nocturne*'s developers were attempting. Unfortunately, they missed their target by a mile.

—Geoffrey Visgilio

MAXIMUM PC VERDICT

Price $50
Company Gathering of Developers
Phone 877.463.4263
URL www.nocturnegame.com

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SuperDisk vs. Zip 100

REMOVABLE STORAGE JUST GOT MORE REMOVABLE WITH USB

Is your hard drive getting full? Do you transfer a lot of big files from home to work and back again? If so, removable storage is what you need. Drives like Zip and SuperDisk were once available only in Parallel and SCSI flavors, but now that USB is "in," you can take full advantage of its speed and hot-swapping capability. We took the reigning champion, Iomega's Zip 100, and pitted it against the underdog, Imation's SuperDisk, to decide once and for all who deserves removable storage bragging rights. Not surprisingly, both drives' names imply greatness—but only one lived up to that reputation.

—Geoffrey Visgilio

Imation SuperDisk USB

We wanted to like the SuperDisk, we really did. But in a world where removable storage has to be fast and exchangeable with your friends' drives, the SuperDisk is a good idea that simply isn't practical.

The SuperDisk we tested ran without a hitch right out of the box, posting media-to-hard drive transfer times that were neck-and-neck with the Zip. But when it came to moving data from our hard drive to media, the Zip rocked the SuperDisk like a hurricane, posting times that were nearly twice as fast. The SuperDisk was also slower when it came to dumping files we didn't want; deleting files over 50MB took almost twice as long as it did with the Zip.

The SuperDisk media does hold 20MBs more than a Zip disk and, unlike the Zip, you can actually use that extra space (you can safely transfer 119MB; with the Zip you can only transfer between 92 and 94MB before it starts barking for another disk). Imation also sells encryption disks accompanied by software that lets you lock data on disks with a password.

We also like the fact that the SuperDisk is compatible with legacy 3.5-inch disks, but at the end of the day, the sucker is just too slow. If there was more support, and if the drives weren't so expensive, our verdict might be more forgiving. But the SuperDisk is too slow, too expensive, and too sparsely used to warrant anything more than a modicum of praise.

Plain, white, and pokey.

PLUSES
- 120MB of usable space per disk
- Doubles as a floppy drive

MINUSES
- Slow
- Expensive

MAXIMUM PC VERDICT

Price $170 ($10 per disk for media)
Company Imation
Phone 800.854.0033
URL www.superdisk.com

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Iomega Zip 100 USB

Let's face it folks. Iomega is like VISA—it's everywhere you want to be. The Zip is the standard in removable storage, and their new USB drive provides by far the easiest means (other than a network) of sharing files among computers. If your friend needs a file from you but doesn't have a Zip, just bring over your USB Zip and plug it in; it's really that easy. And although the Zip isn't greased lightning, it's certainly fast enough for most desktop tasks.

The Zip we tested was encased in a cool transparent blue reminiscent of an iMac, and though some may hate such a blatant ripoff, we liked its sleek look. The USB hookup worked as promised, and several minutes after plugging it into our test system we were transferring files like pros.

The Zip performed with no problems whatsoever, and was much quicker than the Super Disk in file-transferring tasks. But its best feature is the software package. Iomega has included special copy and find commands that make backups easier, and an embedded caching system restores your OS control in no time when moving files. We never waited more than a minute and ten seconds to get ours back, which was four times faster than the SuperDisk.

It would be one thing if the Zip was a gigantic marketing gimmick and a crappy product, but it's fast, practical, portable, and everywhere. As much as we love the idea of two drives in one, and as cool as the SuperDisk is on its own, we have to side with the Zip on this one.

Cool, blue, and very...well, zippy.

PLUSES
- Fast, portable, ubiquitous
- Great software package

MINUSES
- Disc capacity is actually less than 100MB

MAXIMUM PC VERDICT

Price $130 ($10 per disk for media)
Company Iomega
Phone 888.516.8467
URL www.iomega.com

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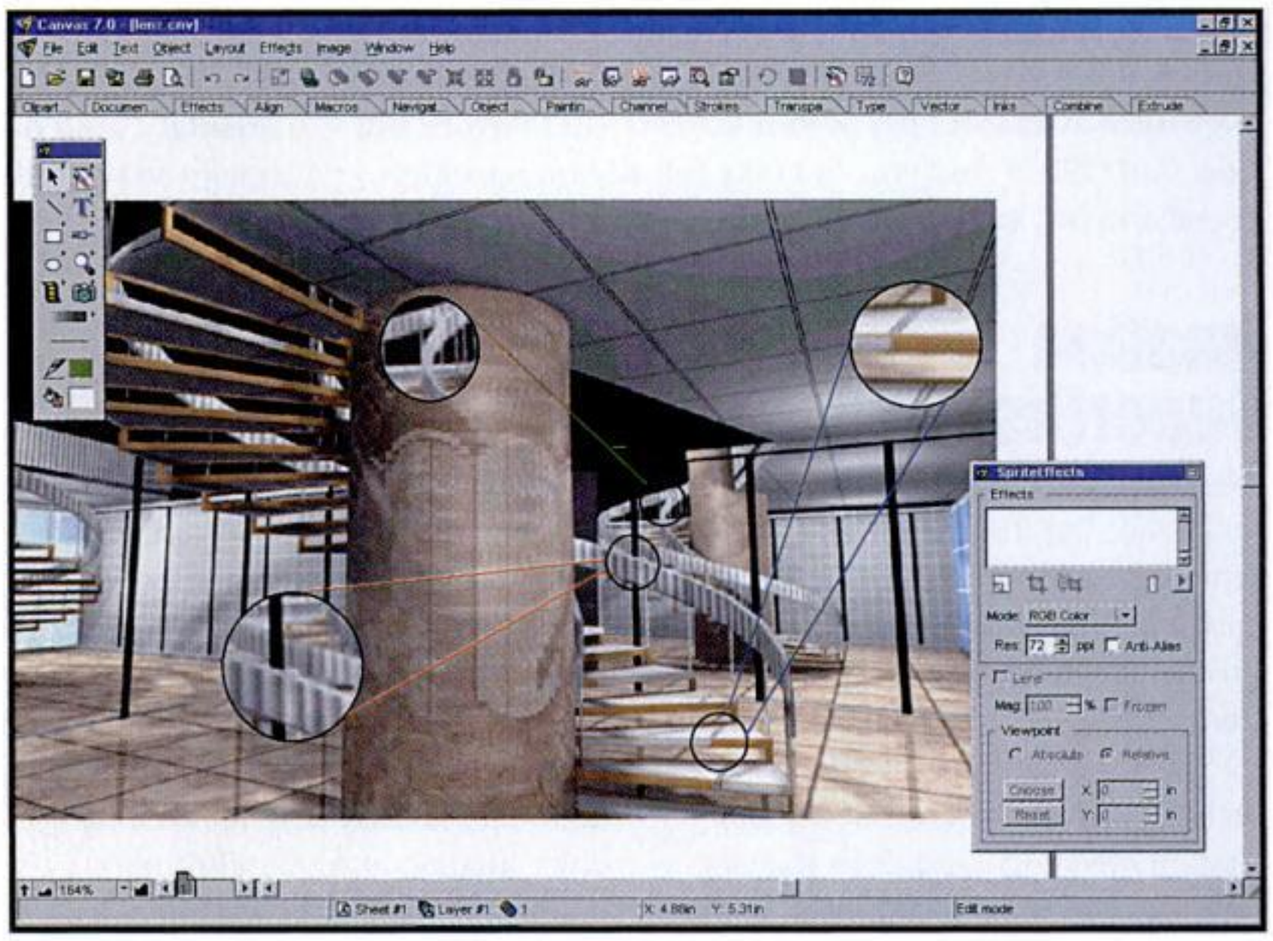
Canvas 7

THE SWISS ARMY KNIFE OF GRAPHICS APPS



Canvas 7 takes a shotgun approach to content creation by including everything you'll ever need to create, edit, and publish for print or the web.

Deneba's *Canvas 7* is the kitchen sink of content creation suites. It includes an illustration program, a page layout program, photo editing tools, a simple animation application for GIFs, a clip art gallery, *and* a WYSIWYG web editor. If you were to buy the separate software equivalents of *Canvas 7*, you'd drop more than two thousand smackers before even coming close to the breadth and depth of this righteous package.

THE SPECS

SYSTEM REQUIREMENTS

- Pentium processor
- 32MB RAM
- 80MB hard disk space
- Windows 95/98/2000

PLUSES

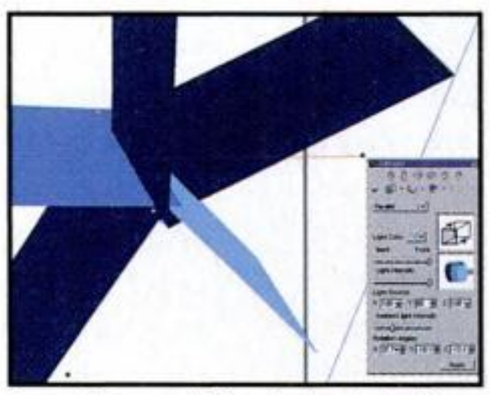
- Very affordable, considering the tools you get
- Sprite Effects are revolutionary
- Support for third-party filters and special effects

MINUSES

- HTML code is sketchy
- Steep learning curve

Canvas 6 won us over with its awesome integration and powerful tools, but the people at Deneba have outdone themselves with version 7. They've also turned *Canvas* into a viable contender against Corel's *CorelDraw 9 Suite*, for about 150 bucks less than Corel's price. With awesome new Sprite Effect features—such as a lens for magnified cutaways of pictures, vector graphic and screen refresh enhancements, and a preview tool that shows pictures as they'll look when exported for the web—all *Canvas* is missing is....well, almost nothing. We would have liked to see the V-basic support for web developers that *CorelDraw 9* boasts, but that's more a wish than a complaint.

Canvas 7's interface is very intuitive, featuring docking palettes that detach from the main toolbar so you can easily configure and customize your workspace. A wizard helps you begin a project and tailors your work area to the project you have in mind, whether it's an illustration, a print layout, or a web page. And with three disks of clip art, *Canvas 7* has more than enough ingredients to get you started right out of the box.



Even 3D modeling is included in *Canvas* 7, letting you make any shape you draw into a 3D object by extruding it.

The most welcome additions to version 7 are definitely the Sprite Effects, first-of-their-kind features that enable you to apply distortions, textures, and third party plug-ins to any project in your work area, including vector or bitmap graphics, text, and even objects that are grouped. Sprite Effects changes are nondestructive, so you can experiment without losing the original editing properties of objects in your work area. This ends the tiresome task of fine-tuning one piece of a project in another application, then repeating the building process all over again.

The application's web features are also well-built. The vector graphics are easily optimized for the web, and bitmapped images can be optimized with almost any compression scheme. Onion skinning allows for easy creation of animated GIFs and scrolling web banners, and pictures can be viewed in a special window (similar to *Photoshop 5.5*'s picture export window) before they're uploaded, so you can view the effects that different compression and dithering options will have on your final pics.

Content created in *Canvas 7* can be made web-ready with ease, and the app's built-in FTP support makes it easy to upload any *Canvas* document that you've saved as an HTML file. However, there are a few drawbacks to this feature; namely, the HTML code sometimes changes upon saving, causing errors.

The app also suffers from a steep learning curve; the users manual's *War and Peace*-like girth makes it a good backup for home defense. Still, *Canvas 7* does put every app we need right at our web-enabled fingertips, and the manual is necessary to explain each and every function of this incredibly diverse product suite.

Typically, we loathe the thought of spending hour upon hour learning the ins-and-outs of monstrous apps such as *Canvas*, but considering how much time it'll save us in the long run, it's a sacrifice we're happy to make.

—Geoffrey Visgilio

MAXIMUM PC VERDICT

Price $375
Company Deneba
Phone 305.569.5644
URL www.deneba.com

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High 'Tec and Low 'Tec

ALTEC AND LABTEC GO 4.1-WHEELIN'

Previously, Labtec and Altec Lansing have taken the low road and the high road, respectively. Altec's earned a rep for delivering the goods... while Labtec's rep runs the other direction. Both companies have new 4.1 systems that will surprise intent listeners and savvy shoppers.

—Brad Dosland

Altec Lansing ACS 56

Since reviewing the Klipsch ProMedia 4.1 speaker system in January, we're a lot harder to impress. That system's power and control are hard to equal—but the Altec Lansing ACS 56 gives 'em a run for the money.

Great satellite design makes the ACS 56s even sweeter.

Geared for gamers, the ACS 56 system provides dual analog inputs for 3D soundcards, such as the SoundBlaster Live! and the Aureal Vortex SQ2500. There's also a S/PDIF input for PCM digital audio playback. Most importantly, the system delivers. All the games we tested with the ACS 56s were instantly more immersive, with laser shots whizzing past our ears and grenades rocking the room.

A big factor in rocking any room is a system's included subwoofer, and Altec delivers a sweet specimen. Chewing up half the system's 70 watts, the 6-inch sub packs a serious wallop in a solidly constructed particle enclosure that delivers rich but tight response. The floor-firing cone is protected by a plastic shield, which can create hum at high-volume low frequencies, and while the sound is rich, the sub response falls off dramatically at a relatively high 70Hz. The absence of a port also siphons off some of the sub's presence, but overall, the response nicely matches the system.

The remaining 35 watts are divided among the four magnetically shielded satellites. With 3-inch cones, these deliver crisp, tight tones that stood the test of our demanding Chopin passage with nary a crackle until we cranked the volume to the max.

Good performance plus good price equals a sweet 4.1 system.

PLUSES
- Great sound and price
- 3D sound support
- S/PDIF input
- Solid sub enclosure

MINUSES
- Some performance issue with the sub
- Cable color-coding is confusing

MAXIMUM PC VERDICT

Price $150
Company Altec Lansing
Phone 800.258.3288
URL www.alteclansing.com

9

Labtec LCS-2514

As high as our expectations are for some speaker systems, they're equally low with Labtec systems. Traditionally synonymous with crappy sound, Labtec has been vowing to impress us with recent offerings. Although the LCS-2514 didn't knock our socks off, the system does provide decent sound for the price.

The LSC-2514 delivers a tad more than you'd expect for the price.

With the LCS-2514, Labtec does one thing amazingly well: It delivers a true 4.1 speaker system for a meager $80. In fact, we found them selling online for as little as $53! Inconceivable! If you're still suffering with the crappy stereo speakers that ship with most systems, you're a fool—salvation is mere 50 bucks away.

On the other hand, if you have good stereo speakers and you give them up for the LCS-2514 speakers, you're also a fool. They aren't *that* good.

True, they are 3D-sound compatible, with independent front and rear inputs. The sub is decent at belting out the low tunes, and with some high-end equalization, the sats can perform admirably as well. But they don't perform nearly as well as other, more expensive systems.

The lightweight plastic cases that house the sats weren't up to our Chopin passage torture test, and delivered static at higher volumes. But the 15-watt ported sub, which takes advantage of an active electronic crossover, delivers deep tones down to a surprisingly low 40Hz. Unfortunately, the signal falls into complete chaos below 80Hz. Labtec's fancy, patented, Real-Time Dynamic Bass Equalization and Max-X Driver can't save the day here.

But for only $50, you won't hear us bitching too much. It's a miracle that the LCS-2514 can deliver as much as it does for the price.

PLUSES
- 4.1 on the cheap
- 3D sound support
- Solid sub design

MINUSES
- Poor sub performance
- Flimsy sats
- Volume controls crackle when adjusted

MAXIMUM PC VERDICT

Price $80
Company Labtec
Phone 360.896.2000
URL www.labtec.com

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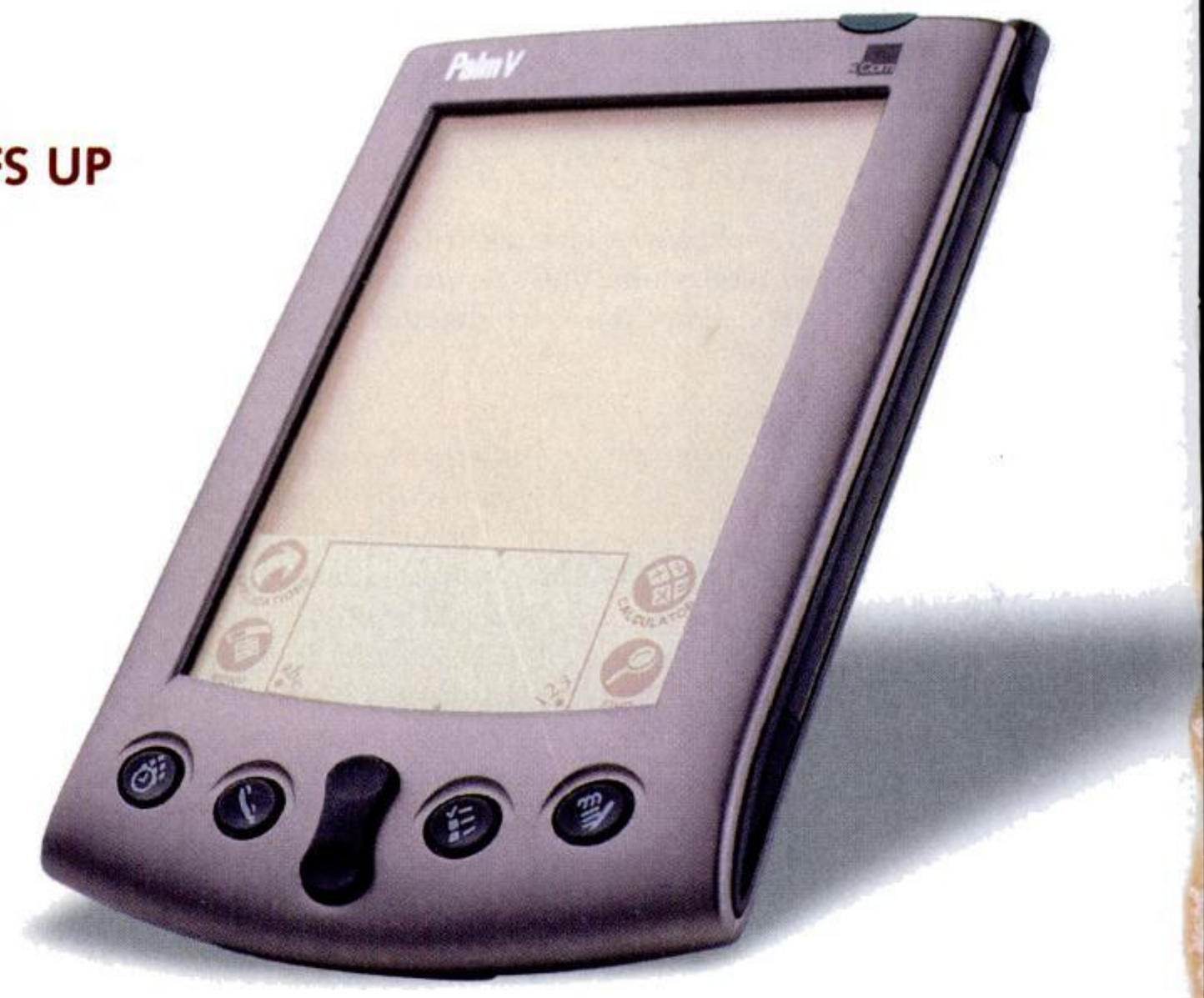
Palm Vx

PETITE V-SERIES BEEFS UP



The smallest Palm features mega-RAM.

The Palm V's fatal flaw is that it favors looks over muscle, but the Palm Vx rectifies that situation in spades. While retaining the V's svelte execu-toy style, Palm has managed to pump up the RAM allotment fourfold, for a grand total of 8MB.

This seemingly bottomless memory will actually change the way you use your Palm. Need to download a ton of e-mails, or a map to the nearest computer store? No problem. We downloaded Judge Penfield Jackson's entire 200-page "findings of fact" on Microsoft, and barely scratched the surface of the Vx's memory capabilities.

But getting data onto the Vx is only half the fun; reading it on the unit's crisp, bright display is also a real treat. Even in low-light conditions, on-screen information is very legible and won't strain your eyes. We don't dig the inverse backlighting, which illuminates only text, but we still feel the V series units have the best screens of all Palm-compatible PDAs.

The Vx also connects to the web via AvantGo.com's web client, so you can set the unit to automatically grab content each day, such as the front page of the *New York Times* or stories from CNET's News.com.

Palm claims that the Vx's faster processor takes less time to synch than the V, but we weren't overly impressed. Backing up 3MB of data took 10 minutes through the included serial adapter. Palm offers a USB adapter as an optional upgrade, but as far as we're concerned, it should be included standard.

Another demerit is the unit's flimsy cover. Is this $2 pleather flap really supposed to protect the PDA? What's worse, the cover presses on the buttons when it's closed, so if you forget to turn the Vx off before putting it your pocket, it beeps at you incessantly.

Like the V, the Vx recharges through its synch-base. A portable charger is available for road trips, but isn't included standard. Battery life is impressive—using a fully charged Vx for several hours a day sucked up only about a third of the battery's juice.

We'll always take brawn over beauty when it comes to our computing, and the Palm Vx strikes a nice balance between the two. With its upped RAM and slick style, the Palm Vx is the first V series PDA worth buying.

—Gordon Mah Ung

PLUSES
- 8MB of RAM
- Sturdy case
- Super bright screen

MINUSES
- Flimsy cover hits keys
- Pricey accessories
- Should include USB and travel charger standard

THE SPECS

SCREEN RESOLUTION
160x160 16-level grayscale screen

PROCESSOR
20MHz Dragonball EZ

RAM
8MB

DIMENSIONS
4.5"x 3.1"x 0.04"

OTHER
Synch cradle I Charger

MAXIMUM PC VERDICT

Price $450
Company Palm Computing
Phone 800.881.7256
URL www.palm.com

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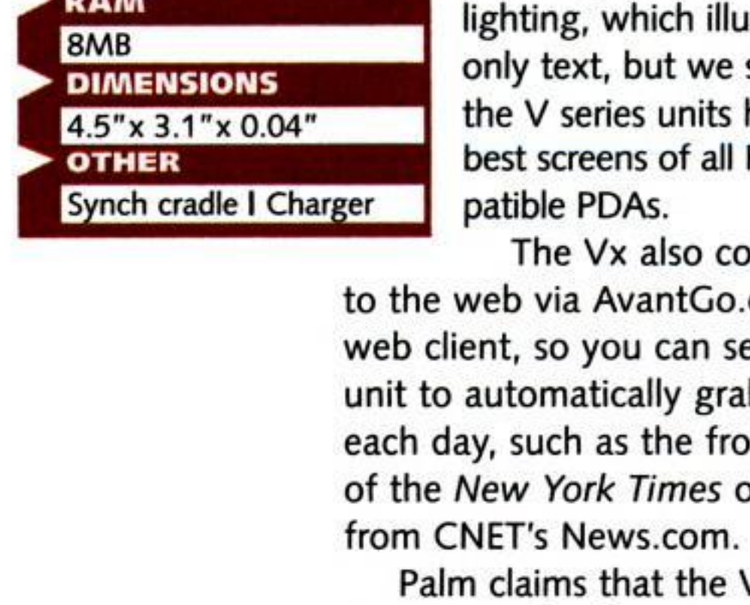
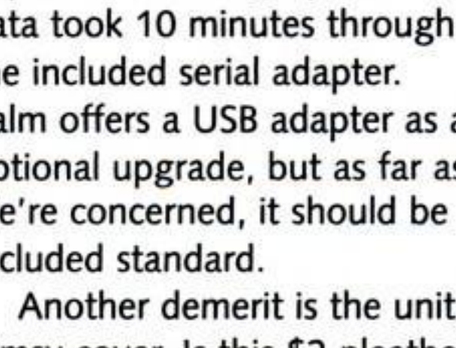
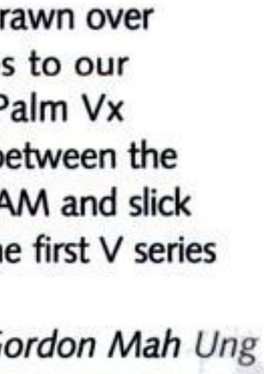
STOWAWAY KEYBOARD



Slightly larger than the original Palm Pilot itself, the Stowaway is a full-size keyboard that magically folds up. It can be used with Palm devices and Windows CE palm-size PCs, though its connector type renders it useless with the Palm Pro, III, and VII series. The Stowaway has three sections that slide and lock into place, and worked quite well with our Vx test unit, though we would have liked to synch and charge the unit by plugging it into the keyboard's cradle. The 69-key keyboard's most impressive feature is its responsive feel, with feedback that's incredibly close to that of a full-size notebook keyboard. We have concerns about its durability, but Stowaway claims the keyboard's keys are certified for 5 million cycles apiece.





Price $100
Company ThinkOutside
Phone 619.295.4994
URL www.thinkoutside.com

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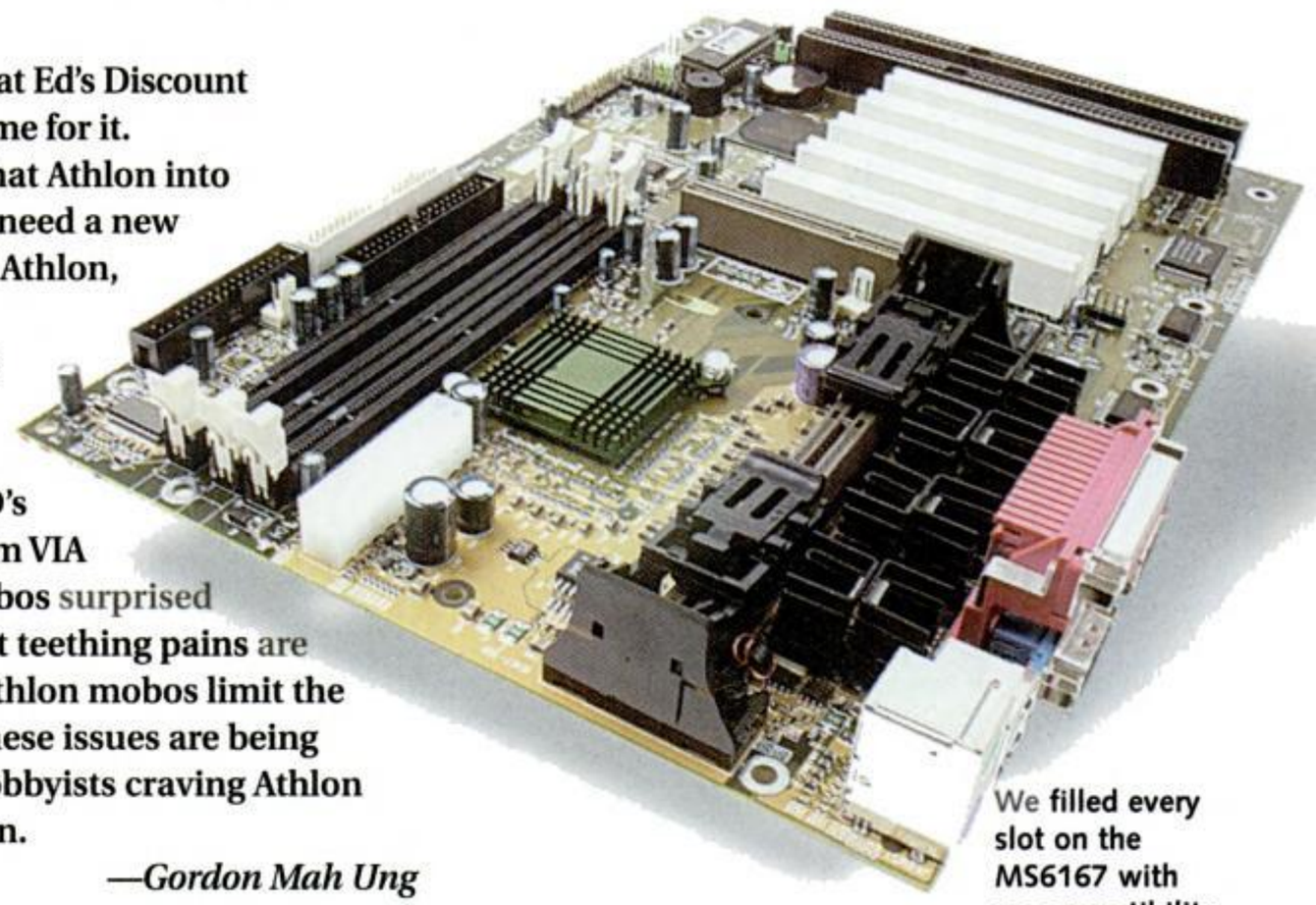
Hot Athlon Mamas

TWO CONTENDERS COURT YOUR ATHLON LOVIN'

You just picked up a new 650MHz Athlon at Ed's Discount CPU Mart, and you can't wait to find a home for it.

But wait—you won't be able to plug that Athlon into your moldy Socket 7 board. No sir, you'll need a new Slot A motherboard primed for the AMD Athlon, and we've got the 411 on two of the top offerings. One is almost a clone of AMD's reference motherboard design, and uses AMD's 750 chipset. The other represents a radical departure from AMD's specs, and favors southbridge silicon from VIA Technologies over AMD silicon. Both mobos surprised us by quickly getting up and running, but teething pains are still apparent—such as the fact that all Athlon mobos limit the AGP bus for GeForce videocards to 1x. These issues are being worked out, though, and it's clear that hobbyists craving Athlon power have a good foundation to build on.

—Gordon Mah Ung



We filled every slot on the MS6167 with no compatibility problems.

Microstar 6167

Bad memories of early Super 7 boards still haunt us, and we expected the same nut-busting experience with Athlon boards. But the MSI 6167 presented a pleasant surprise. We got MSI's Athlon board up and running in just about half an hour, and came away impressed with the board's ability to handle all of our abuse without missing a step.

PLUSES
- Top rating in compatibility testing
- Front USB connector

MINUSES
- Limited availability
- Invisible web site support
- DIMMs slots too close to AGP slot

The board's stability is most likely due to the fact that MSI closely followed AMD's reference design when building it. In fact, it's nearly identical to the Fester motherboards grown on AMD's own mobo farms. The chipset it uses—AMD's own 750—is, feature-for-feature, on par with Intel's famous BX chipset, offering 2x AGP, PC100 support with ECC, and PCI and ISA support.

Of course, AMD's 750 chipset supports the Athlon's 200MHz EV6 memory channel. But the 750 is so new, even Windows 98 Second Edition didn't recognize it. To get the MS6167 fired up, we had to load three included patches in order to upgrade the OS. When we rebooted, the MS6167 came up without a burp.

Knowing full well that no motherboard is 100% compatible with all the tens of thousands of PC components, we tried our best to break the MS6167's spirit. We filled every slot with an assortment of peripherals, including an Adaptec 2940U2 SCSI adapter, 3Com's 3C905B Ethernet card, dual Diamond Voodoo^2 boards, a Diamond Viper 770 Ultra, a Diamond Shotgun ISA modem, a SoundBlaster Live! X-Gamer, a Storm USB scanner, and a Logitech USB mouse. But nothing brought the MS6167 to its knees. We even filled all three DIMM slots with 640MB of Crucial Technology RAM; the mobo kept on chugging. Nothing, it seems, can stop the MS6167.

During our performance tests, the MS6167 came out on top, edging out the FIC SD11 in the STREAM memory bandwidth test, as well as the *Final Reality* AGP bandwidth test. The scores were even in real-world gaming benchmarks, though; the boards scored so close to one another, we thought we were testing the same board twice.

Our positive impression of the MS6167 was marred only by MSI's lack of support. A search of MSI's web site had us wondering if the company even made Slot A motherboards. When we asked the MSI folks about their inept support, they explained that they don't expect the board to be a big hit with "end-users," and thus aren't pushing it. It's a shame, too, because the MS6167 is a solid board that can take a lot of the guesswork out of building an Athlon system.

MAXIMUM PC VERDICT

Price $199
Company Micro-Star International
Phone 510.623.8818
URL www.msicomputer.com

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WHY YOU CAN'T FIND AN ATHLON MOTHERBOARD

- **Too Expensive:** AMD's original "Fester" reference design calls for an expensive six-layer, or six-ply, board that adds from $30 to $50 to the manufacturing cost. Many motherboard companies don't believe people will pay $200 for a Slot A board.
- Waiting For New Technology: VIA Technologies has a KX133 chipset in the works that offers 4x AGP, PC133, and ATA/66 on a four-layer board. A half dozen motherboards from leading companies are on the way and should be out by the time you read this.
- OEMs Eating Demand: With only six original suppliers of motherboards, the bulk of the supply is being sucked up by large PC makers.

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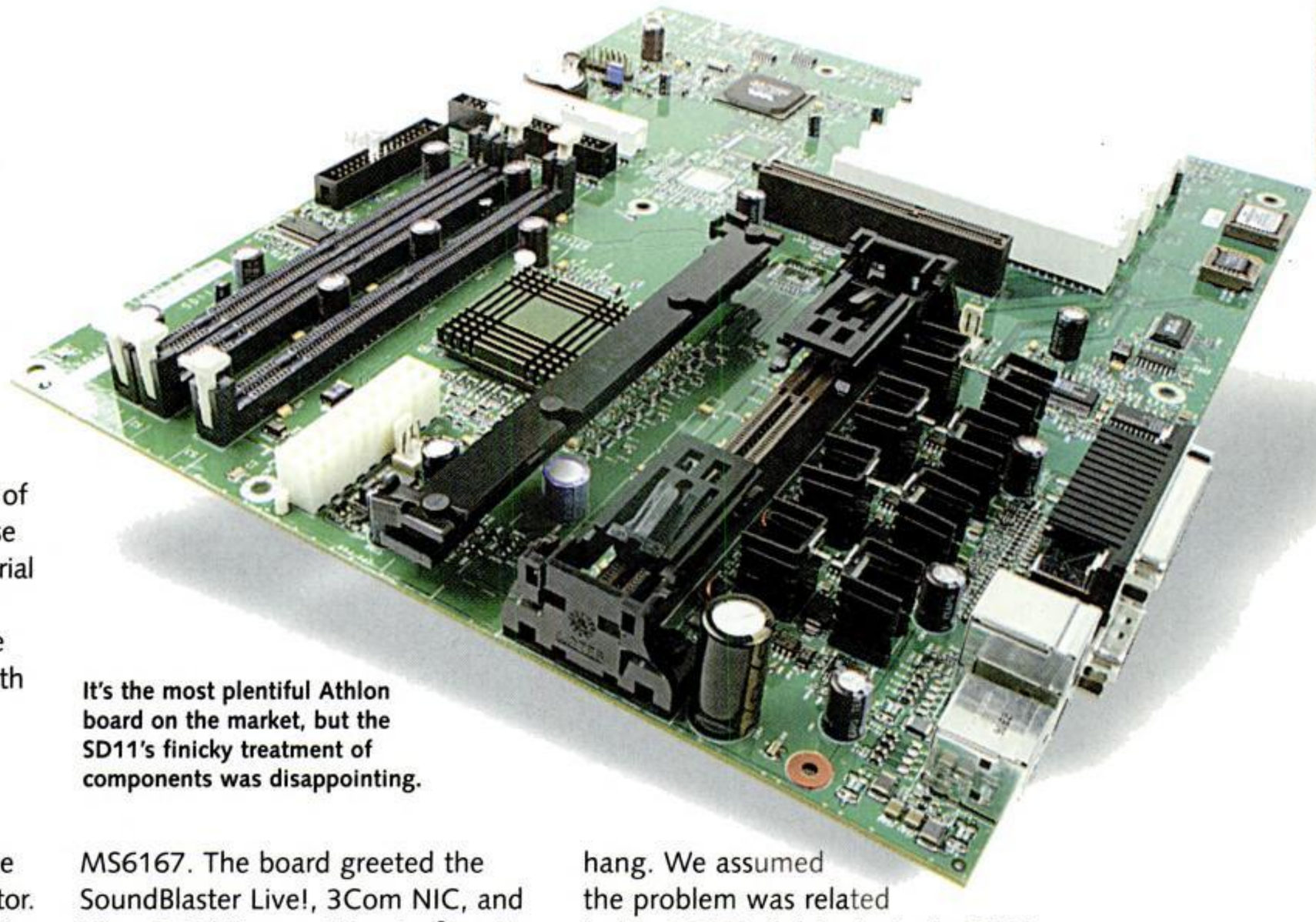
FIC SD11

While most Athlon-motherboard makers, like MSI, have closely followed AMD's Fester reference design, FIC struck out on its own when designing the SD11. Ordinarily, ingenuity is a good thing. But in FIC's case, it seems to have backfired.

Although the company had direct assistance from AMD in designing the SD11, it eschewed several design parameters in favor of more experimental paths. FIC chose to equip the SD11 with a single serial port, versus the standard two, and used a special I/O shield to reverse the placement of the USB ports with the PS/2 keyboard and mouse connectors. There are also several different versions of the board on the market—some have a shared ISA/PCI slot, some don't, and some even include an IEEE 1394 connector.

The board we tested included five PCI slots, an AGP 2x slot, and no ISA slots. As a full-size ATX board, the SD11 is larger than the average mini-ATX board, making it a tight squeeze in some cases, but FIC uses the size to its advantage. The SD11 offers plenty of wiggle room to insert or remove memory when a videocard is already in the system, which is preferable to most mini-ATX



It's the most plentiful Athlon board on the market, but the SD11's finicky treatment of components was disappointing.

MS6167. The board greeted the SoundBlaster Live!, 3Com NIC, and Viper 770 Ultra and Voodoo^2's with open arms, but snarled when we tried to feed it an Adaptec 2940U2 SCSI adapter. No matter where we placed the 2940U2 card, the SD11 would halt when loading the DOS memory manager, EMM386.

And when we tried to fill every DIMM slot available with 128MB or 256MB of Crucial Technology memory, the SD11 just couldn't hang. We assumed the problem was related to the SD11's finicky taste for RAM at first, but the Crucial PC133 modules we used are on FIC's approved list.

Since we weren't sure if we had a faulty early production board or whether the problem was inherent, we contacted FIC. They assured us they haven't seen similar problems on their boards at the plant.

The original BIOS version on the SD11 supported some overclocking abilities by allowing bus speed tweaking, but the board we tested lacked that feature, damnit. FIC says they may re-enable it in future boards, however.

Despite the glitches with the SCSI card and memory, the SD11 provides competent overall performance. In real-world benchmarks, the SD11 proved to be as swift as the MS6167, and was just barely edged out in synthetic benchmarks.

Of all the Athlon motherboards, the SD11 may not be the most compatible, but it's certainly the easiest to find in stores. Unfortunately, given the current state of Athlon boards (see sidebar), the SD11 may be your only choice.

PLUSES
Most widely available
Lower priced

MINUSES
Compatibility issues

DARE TO COMPARE

MANUFACTURER	MICRO-STAR INTERNATIONAL	FIRST INTERNATIONAL COMPUTER OF AMERICA
Model	MS6167	SD11
Chipset	AMD 750 "Irongate"	AMD 750 +VIA 686A
BIOS	Award	AMI
PCI/ISA Slots	5 PCI / 2 ISA (1 shared ISA/PCI)	5/0
Speeds Supported	500-750+	500-750+
DIMMs/Max Memory	3/768MB with ECC support	3/768MB with ECC support
Ports	1 parallel, 2 serial, 2 USB (plus front-mounted USB header) PS/2 Keyboard	1 parallel, 1 serial, 2 USB, PS/2 Keyboard
Drive Interface	Ultra ATA/66	Ultra ATA/66
Quake II v 3.20 1024 x 768	70fps	70fps
Expendable 1024 x 768	53fps	53fps
STREAM For DOS 2.0 (Avg of Five Scores)	426MB/s	412MB/s
bootMark	317	316
Compatibility	Good	Poor
Final Reality 3D Bandwidth Test	93.8 MB/s	88.7 MB/s
Final Reality 2D Bandwidth Test	183.68 MB/s	181.50 MB/s

How we tested. Frame rate, bus bandwidth, and any performance testing was conducted with a Diamond Viper 770 Ultra TNT2 AGP board and nVidia's 3.53 drivers, one Crucial Technologies 128MB DIMM, and a 650MHz Athlon on the board. For compatibility testing, we installed a 3Com 3C905B Ethernet adapter, an OEM Adaptec 2940U2 SCSI adapter, a SoundBlaster Live! Xgamer soundcard, and dual 12MB Diamond Voodoo^2 boards. We also shove in a Logitech USB scanner and Logitech USB mouse.

MAXIMUM PC VERDICT

Price $180
Company First International Computer of America
Phone 510.252.7777
URL www.fica.com

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Logitech Cordless Mouse

ONE LESS WIRE TO WORRY ABOUT

PLUSES
Tracking is surprisingly accurate
Long battery life

MINUSES
Not as accurate as ball mouse
Software is nothing special

While Microsoft has been busy making mice with new-fangled optical recognition technology, Logitech R&D has been focusing on what it feels consumers want more: cordless mice. The Cordless Wheel Mouse Special Edition is Logitech's finest offering yet, though if complete and total accuracy is your thing, you may want to stick with your old-school balled mouse for now.

Unlike the first cordless mice, which used infrared beams to send data back to poppa, the Logitech mouse uses radio frequencies sent from the mouse to a receiver plugged into your PS/2 port. This eliminates the need for a "line of sight" from the mouse to the receiver—a major bonus considering all the clutter sitting on most PC users' desks. Thanks to an average DPI of 400, precision isn't the mouse's forte, but it tracks extremely well for desktop duties and does fine in games. There's an ever-so-slightly-discernable lag in cursor response, but you'd never notice it unless you were a professional gamer). Two AA batteries power the sucker, and last up to six months before an on-screen warning informs you it's time to replace them.

The "Special Edition" we tested is technologically the same as the rest of Logitech's cordless wheel mice, but includes four different snap-on mouse covers for customizing the color (red, blue, black, or yellow) of your little friend. The software package includes the standard *Mouseware*, which lets you assign functions to the two buttons and scroll wheel. Logitech's ambidextrous design also accommodates both north and southpaws, a feature missing from most Microsoft mice.

Free your mouse, and your mind will follow.

The Logitech Cordless Wheel mouse isn't going to turn you into Thresh or revolutionize your computing experience, but the radio technology works exactly as advertised and is awesome for cluttered work areas.

—Josh Norem

MAXIMUM PC VERDICT

Price $50
Company Logitech
Phone 800.231.7717
URL www.logitech.com

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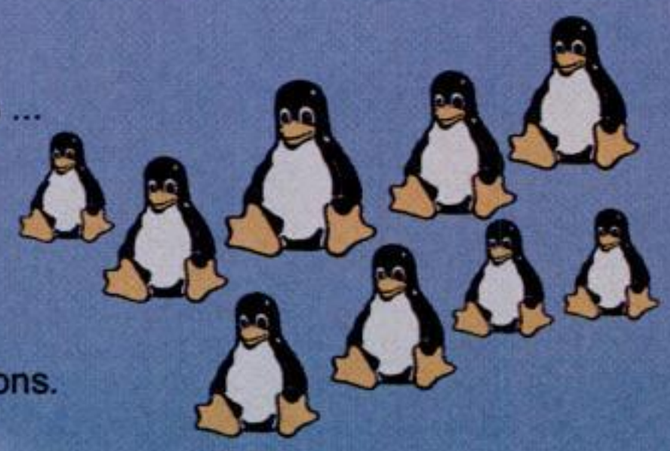

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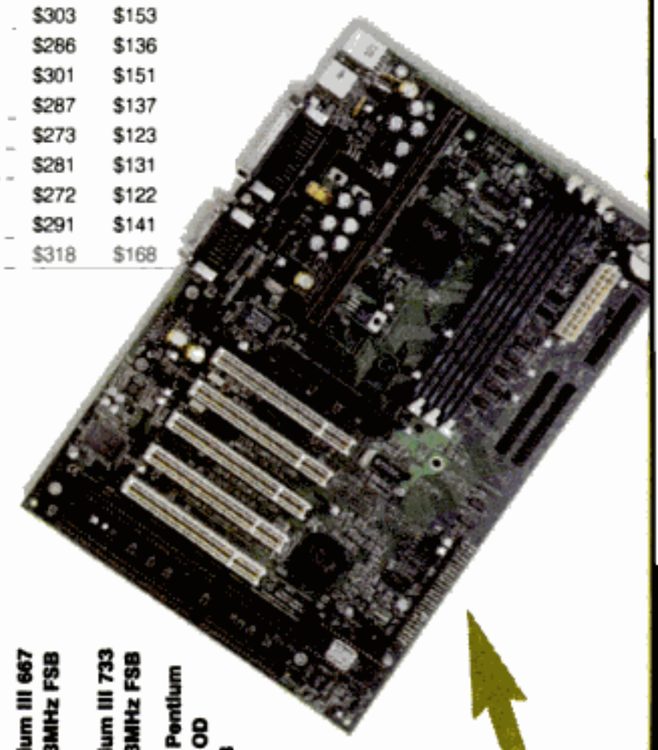
Super7™

	Part Number	Chip Set	L2 Cache (KB)	Maximum Memory (MB)	168-pin DIMM Sockets	72-pin SIMM Sockets	Flash BIOS	Integrated Audio	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD-K6®-2/400 with 3DNow!™	w/AMD-K6-2/450	w/AMD-K6-2/475	w/AMD-K6-2/500	w/AMD-K6-III/400	w/AMD-K6-III/450	w/AMD-K6-III/500	w/Intel® Pentium® MMX™ 233MHz
Asus P5A	*MB5710*	ALi® Aladdin V	512	384	3		Award			5	2	1	ATX	1 Yr.	$97	$147	$159	$185	$209	$207	$255	$292	$142
Asus P5A-B	*MB5711*	ALi Aladdin V	512	384	3		Award			3	2	1	Baby AT	1 Yr.	$96	$146	$158	$184	$208	$206	$254	$291	$141
EPoX EP-MVP3C2	*MB5406*	VIA Apollo MVP3	512	384	3		Award		UltraDMA/66	4	2	1	Baby AT	2 Yrs.	$82	$132	$144	$170	$194	$192	$240	$277	$127
EPoX EP-MVP3G5	*MB5405*	VIA Apollo MVP3	2048	384	3		Award		UltraDMA/66	5	2	1	ATX	2 Yrs.	$108	$158	$170	$196	$220	$218	$266	$303	$153
EPoX EP-MVP4-A	*MB5403*	VIA Apollo MVP4	512	768	3		Award	AC-97	UltraDMA/66	4	2		ATX	2 Yrs.	$91	$141	$153	$179	$203	$201	$249	$286	$136
FIC PA-2013 (2MB Cache)	*MB5214*	VIA Apollo MVP3	2048	384	3		Award			4	2	1	ATX	1 Yr.	$106	$156	$168	$194	$218	$216	$264	$301	$151
FIC PAG-2130	*MB5215*	VIA Apollo MVP4	1024	768	3		Award	ESS	UltraDMA/66	4	1		MicroATX	1 Yr.	$92	$142	$154	$180	$204	$202	$250	$287	$137
FIC VA-503+	*MB5211*	VIA Apollo MVP3	1024	512	2	4	Award			3	3	1	Baby AT	1 Yr.	$78	$128	$140	$166	$190	$188	$236	$273	$123
FIC VA-503A	*MB5212*	VIA Apollo MVP3	1024	768	3		Award	ESS	UltraDMA/66	4	1	1	Baby AT	1 Yr.	$86	$136	$148	$174	$198	$196	$244	$281	$131
Shuttle HOT-591P	*MB5611*	VIA Apollo MVP3	512	256	2	2	Award			3	3	1	Baby AT	1 Yr.	$77	$127	$139	$165	$189	$187	$235	$272	$122
Tyan S1590S Trinity 100AT	*MB5006*	VIA Apollo MVP3	1024	384	3	2	Award			4	4	1	Mini AT	3 Yrs.	$96	$146	$158	$184	$208	$206	$254	$291	$141
Tyan S1598 Trinity ATX	*MB5008*	VIA Apollo MVP3	2048	384	3		Award		UltraDMA/66	5	2	1	ATX	3 Yrs	$123	$173	$185	$211	$235	$233	$281	$318	$168



Slot A

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Athlon™ 550MHz	w/AMD Athlon 600MHz	w/AMD Athlon 650MHz	w/AMD Athlon 700MHz	w/AMD Athlon 750MHz	w/AMD Athlon 800MHz
AMD K7M	*MB7701*	AMD-751 / VIA 686A	768	3	Award	100/120/133	UltraDMA/66	5	1	1	ATX	1 Yr.	$199	$449	$519	$684	$799	$984	$1189
FIC SD11	*MB7401*	AMD-751 / VIA 686A	768	3	Award	100/120/133	UltraDMA/66	5	1	1	ATX	1 Yr.	$142	$392	$462	$627	$742	$927	$1132
GVC QS750	*MB7601*	AMD-750	768	3	Award	100	UltraDMA/66	4	3	1	ATX	1 Yr.	$159	$409	$479	$644	$759	$944	$1149
Microstar MS-6167	*MB7201*	AMD-750	768	3	Award	100	UltraDMA/66	5	2	1	ATX	1 Yr.	$159	$409	$479	$644	$759	$944	$1149

Socket 370

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	PCI Slots	ISA Slots	AGP Slot	AMR Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Celeron™ processor 433MHz 128K OD 66MHz FSB	w/Intel Celeron 466 128K OD 66MHz FSB	w/Intel Celeron 500/A 128K OD 66MHz FSB	w/Intel Celeron 533/A 128K OD 66MHz FSB	w/Intel Pentium III 500E 256K OD 100MHz FSB	w/Intel Pentium III 550E 256K OD 100MHz FSB	w/Intel Pentium III 667 256K OD 133MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Dual Intel Pentium III 750 256K OD 100MHz FSB
ABIT BM6	*MB6504*	Intel 440BX	768	3	Award			5	2	1		ATX	1 Yr.	$112	$190	$217	$263	$312	$342	$402	N/A	N/A	N/A
ABIT BP6 (Dual)	*MB6506*	Intel 440BX	768	3	Award			5	2	1		ATX	1 Yr.	$152	$230	$257	$303	$352	$382	$442	N/A	N/A	$1912
EPoX EP-3VBA2	*MB6854*	VIA Apollo Pro 133A	768	3	Award	AC-97		4	1	1	1	ATX	2 Yrs.	$98	$176	$203	$249	$298	$328	$388	$628	$768	N/A
SuperMicro 370SBA	*MB6131*	Intel 440BX	768	3	AMI			4	3	1		ATX	1 Yr.	$111	$189	$216	$262	$311	$341	$401	N/A	N/A	N/A
SuperMicro 370SEA	*MB6140*	Intel 810e	512	2	AMI	Intel 810e	Intel 810e	6	1		1	ATX	1 Yr.	$131	$209	$236	$282	$331	$361	$421	$661	$801	N/A
Tyan S1857 Trinity 371	*MB6017*	Intel 440BX	768	3	AMI			6	1	1		ATX	3 Yrs.	$105	$183	$210	$256	$305	$335	$395	N/A	N/A	N/A
Tyan S1854 Trinity 400	*MB6018*	VIA Apollo Pro 133A	768	3	Award			6	1	1		ATX	3 Yrs.	$108	$186	$213	$259	$308	$338	$398	$638	$778	N/A

Slot 1

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	168-pin RIMM Sockets	Flash BIOS	Integrated Audio	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel Pentium III processor 500MHz 512K 100MHz FSB	w/Intel Pentium III 533EB 256K OD 133MHz FSB	w/Intel Pentium III 550 512K 100MHz FSB	w/Intel Pentium III 600E/EB 256K OD 100/133MHz	w/Intel Pentium III 650 256K OD 100MHz FSB	w/Intel Pentium III 667 256K OD 133MHz FSB	w/Intel Pentium III 700 256K OD 100MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 750 256K OD 100MHz FSB	w/Dual Intel Pentium III 750 256K OD 100MHz FSB
ABIT BE6-II	*MB6508*	Intel 440BX	768	3		Award		UltraDMA/66	5	1	1	ATX	1 Yr.	$152	$382	N/A	$452	$527	$652	N/A	$817	N/A	$1032	N/A
ABIT BF6	*MB6507*	Intel 440BX	768	3		Award			6	1	1	ATX	1 Yr.	$122	$352	N/A	$422	$497	$622	N/A	$787	N/A	$1002	N/A
ABIT BX6 (2.0)	*MB6502*	Intel 440BX	1024	4		Award			3	2	1	ATX	1 Yr.	$141	$371	N/A	$441	$516	$641	N/A	$806	N/A	$1021	N/A
ABIT VA6	*MB6509*	VIA Apollo Pro 133	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr.	$91	$321	$346	$391	$466	$591	$621	$756	$791	$971	N/A
Asus P2B98-DS	*MB6707*	Intel 440BX	1024	4		Award			4	2	1	ATX	1 Yr	$479	$709	N/A	$779	$854	$979	N/A	$1144	N/A	$1359	$2239
Asus P2B-B	*MB6714*	Intel 440BX	768	3		Award			4	2	1	Baby AT	1 Yr	$137	$367	N/A	$437	$512	$637	N/A	$802	N/A	$1017	N/A
Asus P3B-F	*MB6720*	Intel 440BX	1024	4		Award			6	1	1	ATX	1 Yr	$144	$374	N/A	$444	$519	$644	N/A	$809	N/A	$1024	N/A
EPoX EP-6VBA2	*MB6855*	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	4	2	1	ATX	3 Yrs.	$111	$341	$366	$411	$486	$611	$641	$776	$811	$991	N/A
FIC KA11	*MB6411*	VIA Apollo Pro 133A	1024	4		Award		UltraDMA/66	5	2	1	ATX	1 Yr	$100	$330	$355	$400	$475	$600	$630	$765	$800	$980	N/A
Intel CC820	*MB6919*	Intel 820	512	2		Intel/Phoenix		UltraDMA/66	5		1	ATX	3 Yrs.	$149	$379	$404	$449	$524	$649	$679	$814	$849	$1029	N/A
Intel L440GX+	*MB6917*	Intel 440GX	2048	4		Intel/Phoenix		Adaptec 2-Ch U2W	6	1		ATX	3 Yrs.	$539	$769	N/A	$839	$914	$1039	N/A	$1204	N/A	$1419	$2299
Shuttle AV61	*MB6308*	VIA Apollo Pro 133	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr	$81	$311	$336	$381	$456	$581	$611	$746	$781	$961	N/A
SuperMicro PIIISCD (US)	*MB6142*	Intel 820	512	2		AMI	AC-97	UltraDMA/66	5		1	ATX	1 Yr	$175	$405	$430	$475	$550	$675	$705	$840	$875	$1055	N/A
SuperMicro PIIISED	*MB6142*	Intel 810e	512	2		AMI	AC-97	UltraDMA/66	6			ATX	1 Yr	$129	$359	$384	$429	$504	$629	$659	$794	$829	$1009	N/A
SuperMicro PIIIDME	*MB6151*	Intel 840	4096	6		AMI	AC-97	Intel PRO/100+	6		1	ATX	1 Yr	$329	Call	$584	Call	$704	Call	$859	Call	$1029	Call	Call
SuperMicro P6DGH	*MB6129*	Intel 440GX	2048	4		AMI		Adaptec 2-Ch U2W	9	2	1	Full AT	1 Yr.	$799	$1029	N/A	$1099	$1174	$1299	N/A	$1464	N/A	$1679	$2559
SuperMicro P6DGU	*MB6122*	Intel 440GX	2048	4		AMI		Adaptec U2W	5	2	1	ATX	1 Yr	$459	$689	N/A	$759	$834	$959	N/A	$1124	N/A	$1339	$2219
SuperMicro P6SBA	*MB6120*	Intel 440BX	768	3		AMI			4	3	1	ATX	1 Yr.	$143	$373	N/A	$443	$518	$643	N/A	$808	N/A	$1023	N/A
SuperMicro P6SBU	*MB6128*	Intel 440BX	1024	4		AMI		Adaptec U2W	4	3	1	ATX	1 Yr	$329	$559	N/A	$629	$704	$829	N/A	$994	N/A	$1209	N/A
Tyan S1857 Trinity 371	*MB6017*	Intel 440BX	768	3		AMI			6	1	1	ATX	3 Yrs.	$105	$335	N/A	$405	$480	$605	N/A	$770	N/A	$985	N/A
Tyan S1854 Trinity 400	*MB6018*	VIA Apollo Pro 133A	768	3		Award		UltraDMA/66	6	1	1	ATX	3 Yrs.	$108	$338	$363	$408	$483	$608	$638	$773	$808	$988	N/A

Slot 2

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	Integrated Controller	Integrated Networking	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel Pentium III Xeon 550MHz 512K	w/Intel Pentium III Xeon processor 550MHz 1024K cache	w/Intel Pentium III Xeon 550MHz 2048K	w/Dual Intel Pentium III Xeon 550MHz 512K	w/Dual Intel Pentium III Xeon 550MHz 1024K	w/Dual Intel Pentium III Xeon 550MHz 2048K	w/Quad Intel Pentium III Xeon 550MHz 512K	w/Quad Intel Pentium III Xeon 550MHz 1024K	w/Quad Intel Pentium III Xeon 550MHz 2048K
AMI MegaPlex II	*MB6215*	Intel 450NX	4096	16	AMI		2MB ATI			7	1		9U Rack	1 Yr.	$3995	$5095	$6325	$8335	$6195	$8655	$12675	$8395	$13315	$21355
Asus XG-DLS	*MB6713*	Intel 440GX	2048	4	AMI			Adaptec 2-Ch U2W	Intel PRO/100+	5	1	1	ATX	1 Yr	$779	$1879	$3109	$5119	$2979	$5439	$9459	N/A	N/A	N/A
SuperMicro S2DM3	*MB6150*	Intel 840	4096	6	AMI	AC-97		Adaptec Ultra3/160m	Intel PRO/100+	6		1	ATX	1 Yr	Call	Call	Call	Call	Call	Call	Call	N/A	N/A	N/A
SuperMicro S2DG2	*MB6136*	Intel 440GX	2048	4	AMI			Adaptec 2-Ch U2W		5	2	1	ATX	1 Yr.	$549	$1649	$2879	$4889	$2749	$5209	$9229	N/A	N/A	N/A
SuperMicro S2DGE	*MB6135*	Intel 440GX	2048	4	AMI					5	2	1	ATX	1 Yr.	$329	$1429	$2659	$4669	$2529	$4989	$9009	N/A	N/A	N/A

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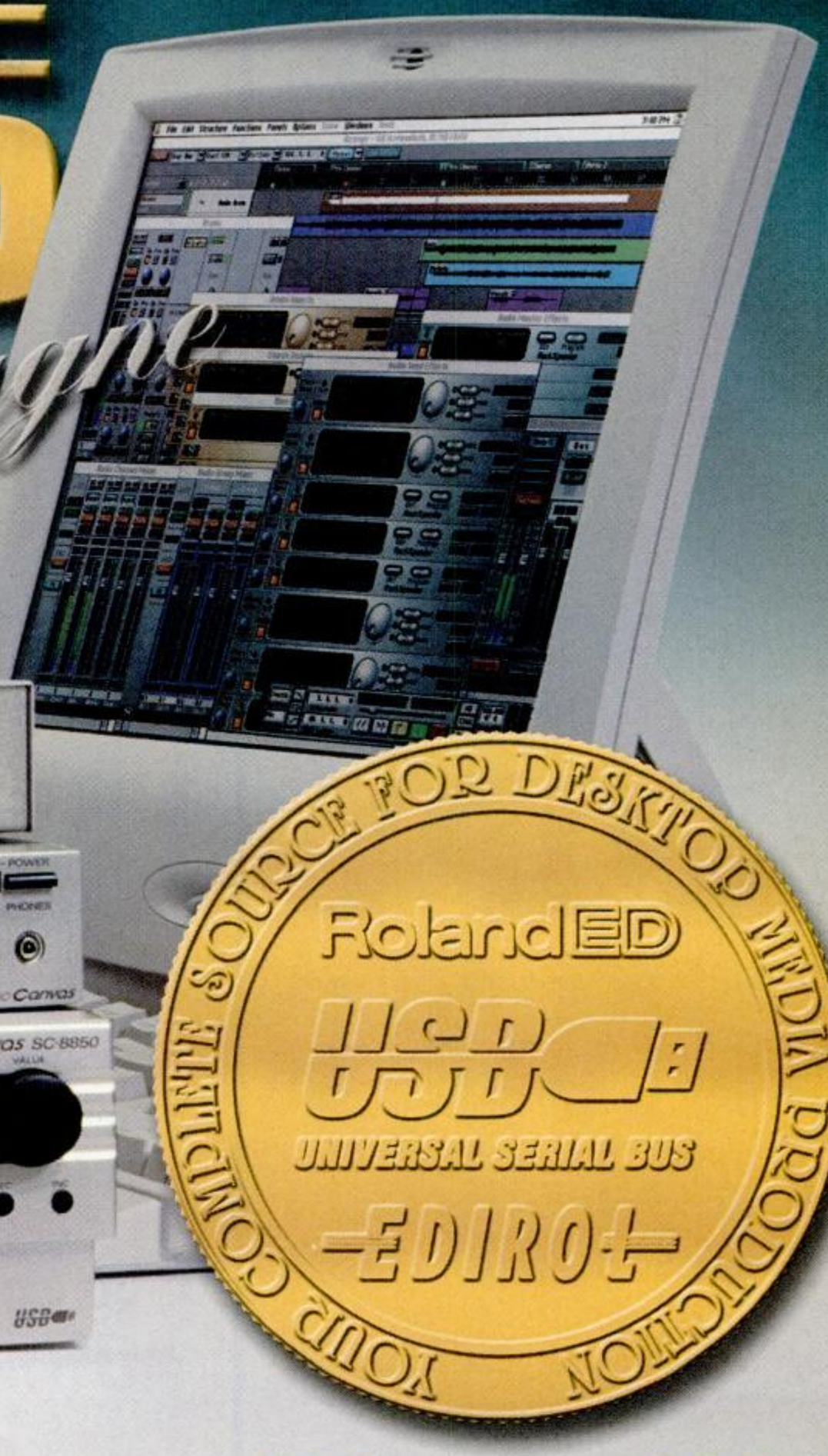

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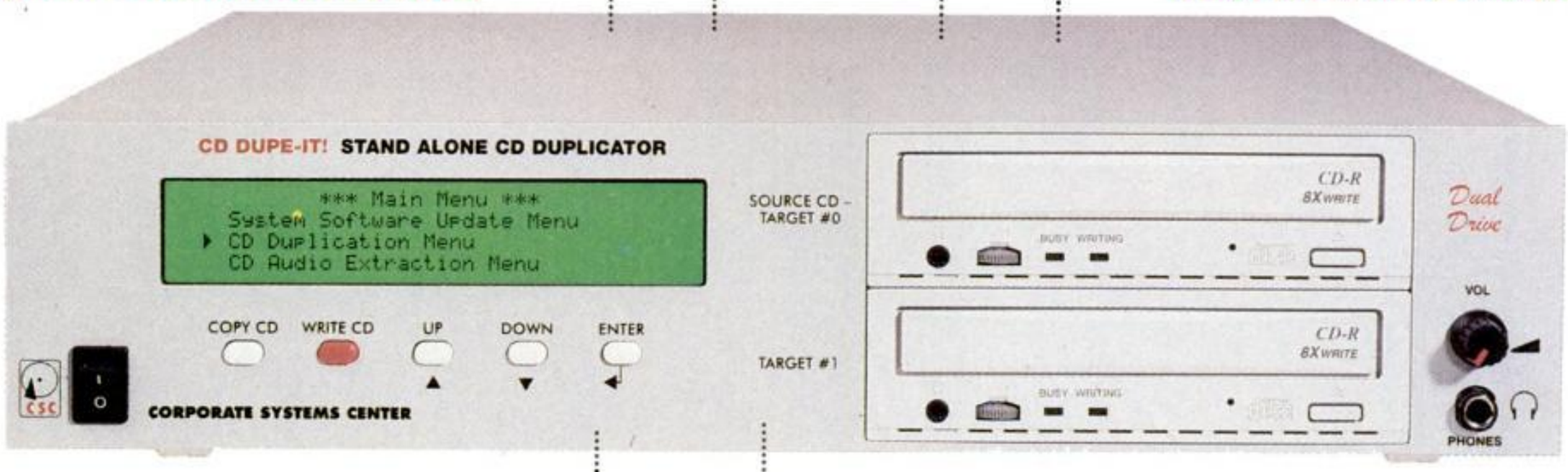

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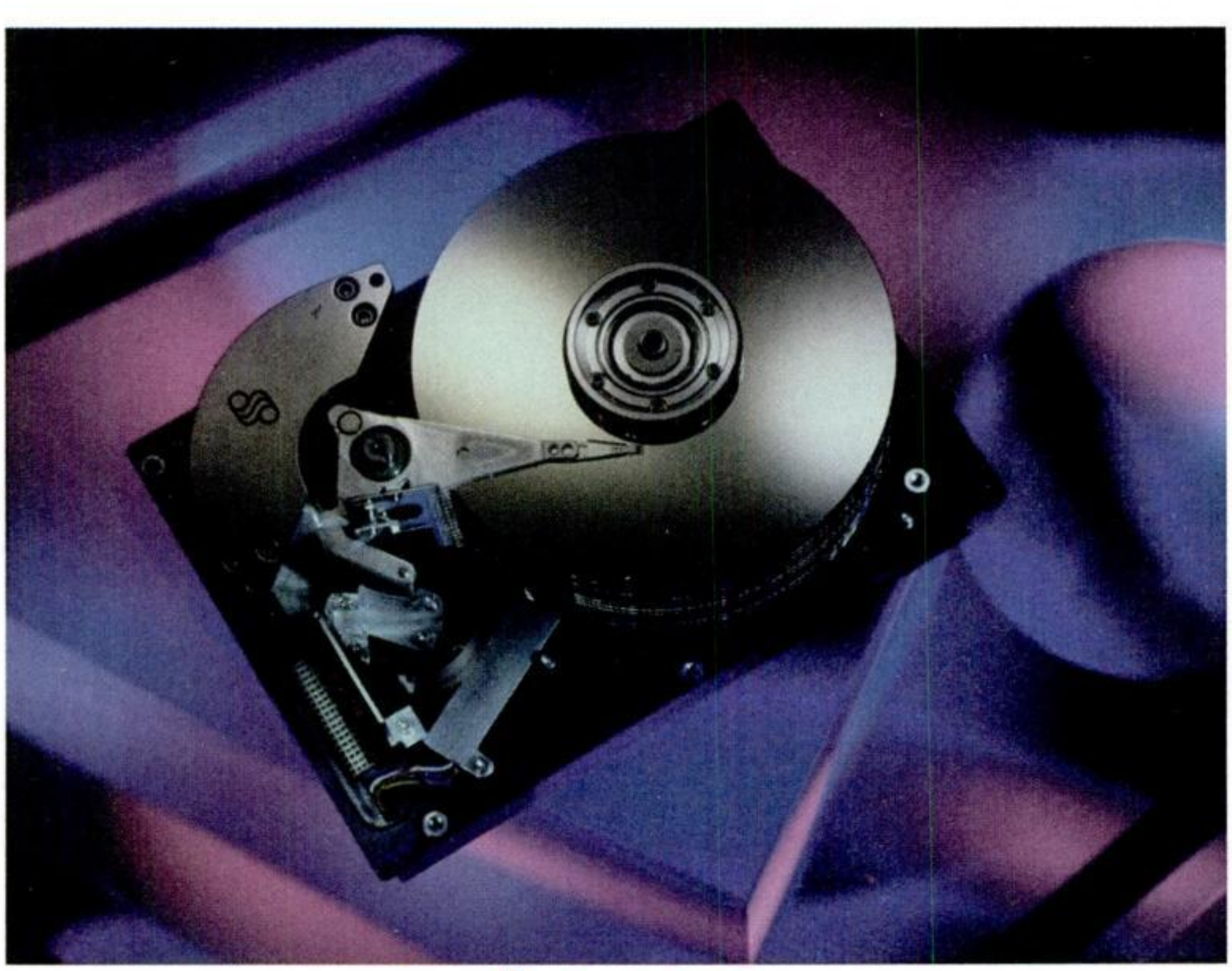

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TERMINATOR

Tech Terms Revealed ▶

Technical terms found throughout MAXIMUM PC are underlined and in blue. Hyperlink back to here for revelation and further explanation. Terms appearing in **blue** within the Terminator are updated definitions of previously explained concepts.

B

Bitmapped A memory model in which each bit on screen is "mapped" to its corresponding screen pixel. Used to describe pixel oriented displays (namely images), from 1-bit (true bitmapped) to grayscale (8-bits per pixel) to full color (16 or 24-bits per pixel). Because of this pixelation, bitmapped images take up more space and are more difficult to alter than vector-based graphics.

Bot A computer-controlled opponent, usually in a game.

C

CAV Constant Angular Velocity. CAV CD-ROM drives spin discs at a constant speed, so the data rate increases as the pickup moves to the outer edges of the disc. Constant motor speed eliminates the need for settling of the optical pickup after seeking data, resulting in an improved access rate. CAV-based drives are simpler to design and produce because the motor doesn't need to change speed.

CDDB Compact Disc Database Online database containing

COBOL COmmon Business-Oriented Language. COBOL is a programming language that dates back to the 1950s and was the standard for many years on mainframe computers. Some say that most of the business code still running on computers today was written in COBOL, but it has been largely superseded by modern languages.

Core The main logic circuits of a microprocessor chip (CPU). The term usually refers to the microarchitecture (internal design) of a CPU, exclusive of buses and caches. For example, Intel's Pentium III and Celeron processors have virtually identical cores, even though they have different configurations of L2 caches and buses.

Curved Surfaces The bezier curves used in Quake III are generated as procedural geometry, which takes a set of parameters that describe the shape of the curve and generates a scalable number of vertices or polygons that can be adjusted to increase or decrease the detail of the curved surface. The faster the machine the more triangles that can be generated.

D

DDR Double data rate SDRAM The next evolution of SDRAM that doubles the memory bandwidth by receiving data on both the rising and falling edges of a clock.

Direct3D A subset of Microsoft's DirectX Application Program Interface. This interface allows developers to use hardware acceleration for 3D graphics, which helps games run faster by offloading the 3D processing onto a dedicated piece of hardware.

DLL Dynamic Link Library. An indispensable little nugget of software that gets deposited surreptitiously on your hard drive and makes everything melt down when it's unintentionally uninstalled.

DXTC DirectX texture compression. The texture compression scheme designed by S3 and adopted as a standard in DirectX 6.0. DXTC is a hardware scheme that achieves 6:1 compression ratios.

E

EV6 A 200MHz interface and protocol AMD licensed from Digital that features point-to-point transfers. Unlike Intel's GTL+ bus, the EV6 has dedicated channels and does not share bus bandwidth.

F

Fill rate The number of pixels that a videocard pumps on screen during a fixed span of time; measured in millions of pixels per second.

FOV Field of Vision The area that encompasses the sight of both eyes.

G

GDI Graphical Display Interface. The display subsystem within Windows that controls and maintains the way graphics will be displayed onscreen. As opposed to DirectX, the GDI is heavily layered, allowing no direct access to hardware. For data transfers to take place, an application must interface with the GDI and wait for it to pass this onto the display driver.

Glide 3Dfx's proprietary programming interface (API) for its Voodoo family of videocard accelerators. It's usually faster and easier to program for than Direct3D.

H

Hardware transform and lighting Offloading the geometry portion of the 3D pipeline from the CPU to the processor aboard a videocard. The geometry stage of 3D rendering involves coordinating the placement of each object according to the ever-changing perspective of the player.

I

IC Integrated Circuit Any silicon computer chip, be it a memory chip, CPU, or DSP.

ID3 An ID3 tag attaches a small amount of reference information to a song file. When the file is loaded into a software player, the tag info (song title, artist, album, year, genre and random comments) can be displayed.

I/O Shield The little metal plate that clips into the back of ATX cases. Parallel, serial, PS/2, and USB, as well as onboard sound and video, are passed through this plate.

N

NPC Nonplayer character. In gaming parlance, a character that affects the outcome of a game, but is not played by a participant in the game.

O

Off-die L2 cache L2 cache that shares a daughter card with the processor die.

Onion skinning Similar to cell animation in cartoons, onion skinning means making all the layers in your animation partially visible so you can see what your animation is going to look like, frame by frame, while you're working on it, instead of having to play the animation through each time you make changes.

OpenGL Open Graphics Language. An easy-to-use graphics API created by Silicon Graphics. In the Windows 9X world, OpenGL plays David to Microsoft's Direct3D Goliath.

P

PCM Pulse Code Modulation The audio format used in CDs and most professional-grade digital recorders, including DAT. In contrast to digital data-reduction systems, PCM systems reproduce 100 percent of the audio data.

R

RMA Return Merchandise Authorization. The authorization from provided by a vendor to whom you wish to return a product.

S

Scanline interleave (SLI) Term used when two videocards work in tandem, with one videocard rendering the odd lines of a video output, while the other card renders the even lines. With the 3Dfx Voodoo2, the slave 3D card will send its rendered output via a ribbon cable into the master videocard, where the combined output is then generated on screen by the master card. Having two videocards work as one raises overall rendering performance, and in the Voodoo2's case, allows a higher rendering resolution to be obtained.

Single-textured rendering Think of pixel processing as a conveyer belt, where the pixel data goes down the line and is given attributes along the way (such as color, level of transparency (alpha), positioning in the z-axis, lighting, and so forth). A single rendering cycle is just such an operation, with the final output being sent to a rasterizer, where it is displayed onscreen. Certain attributes, such as bump mapping, environmental reflections, or lighting, may require a second run through this pipeline before heading off into the rasterizer for display. This second run down the conveyer belt is time-consuming and processor-consuming. If a 3D accelerator has a second processor that applies that second attribute alongside all the other attributes during that first cycle, the pixel can be processed in a single-cycle, thus speeding up the process.

Six-layer The process by which a printed circuit board is made with six circuit layers.

SSE Streaming SIMD Extensions. A set of 70 instructions from Intel that speed up the Pentium III's floating-point, integer, and memory streaming power. SIMD stands for Single Instruction Multiple Data. This processing strategy tells a single programming instruction to perform the same operation on two or more pieces of data. SSE is similar to AMD's 3DNow! but brings more to the table via memory streaming enhancements.

Stencil buffer A small chunk of closely coupled RAM used for storing data that will be quickly compared to incoming data and changed as needed. A stencil buffer could be used to hold data for simulating realtime changes in a chunk of a scene, such as a mirror or shadows. Any changes can be quickly be changed and the output can accurately reflect these changes.

Super 7 After Intel abandoned the Socket 7 CPU connector for Slot 1, a gaggle of other x86 companies combined expertise to create the "Super 7" spec with support for such things as AGP and a 100MHz system bus.

Sysops System operator. Anyone who runs a small server or BBS.

T

T-buffer The T-Buffer is 3dfx's fancy implementation of an accumulation buffer, which operates at the other end of the rendering pipeline to combine multiple image renderings to create advanced digital effects.

V

V-basic A shortened name for the object-oriented programming language Visual Basic, which is used in the development of Windows applications. Visual Basic has a strong emphasis on user interface and object actions, so it is being used to enrich web sites and add new levels of interactivity

Vector-Based Graphics A term used to describe a new trend in bringing dynamic content to the web while maintaining a small file size. Images are created through a sequence of mathematical equations that place shapes or lines in a given two-dimensional or three-dimensional space. Unlike bitmapped images, where a bit is used for each segment of a shape, a vector graphic file only describes a series of points to be connected. The result is a much smaller file and no image distortion or disintegration when the size and shape of the vector file is manipulated.

Voodoo Scalable Architecture 3dfx's new multiple chip technology that the supports the integration of one to 32 chips on a single videocard.

V-sync Vertical Synchronization. Also known as the vertical retrace signal. A term referring to the signal that redraws the vertical display of a CRT. How fast this signal is redrawn is referred to as the refresh rate. Usually given in Hertz (Hz), most videocards synchronize buffer swaps with the refresh rate, so frame rates under these circumstances will never go past the refresh rate. Some videocards allow buffer swaps to happen without synching to the refresh rate. This will almost always result in faster frame rate results, at the expense of visual quality. When a videocard renders without synching to the refresh rate, visual anomalies, such as tearing and shearing of the image, will occur.

VxD Virtual Device Driver. A Windows driver that enables nitty-gritty interaction between hardware and the operating system's base kernel.

W

Why Used in direct, indirect, or implied questions demanding an answer. For instance: Why are you talking to yourself? Why is the dog on fire? Why won't you sleep with me?

WMA Windows Media Audio A proprietary audio encoding scheme, developed by Microsoft. WMA files are similar to MP3s, but are smaller in size.

Z

Z-buffer In a 3D videocard, local video memory is often used to form a frame-buffer, which stores data required to properly render a scene. With the advent of texture-mapped polygons interacting in a 3D world in realtime, the need to have a buffer with which to track positioning became a necessity. A z-buffer stores the z-axis value (front to back) of a pixel on-screen—this value is compared with incoming z-value data to determine whether the pixel will be drawn or not, and how overlapping pixels will be presented. The z-buffer speeds up 3D gaming by not rendering the parts of a scene that are obscured by other objects.

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BY JON PHILLIPS

The Microsoft Office Assistants Who Never Made It...

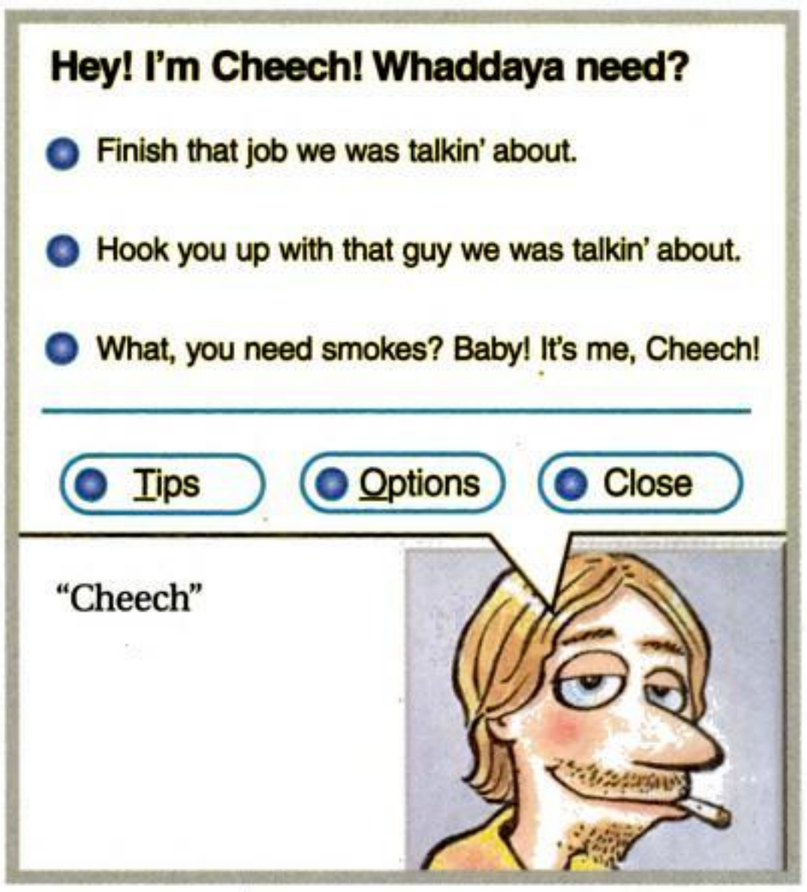
It happens to all first-time users of Microsoft *Word*: You fire up the program, and up pops that insipid paperclip. His name is "Clippit" and he's the most offensive animated help icon in the history of computers. Does Clippit still bother you at the most inopportune times? Just be glad you're not being served by the help assistants who were rejected...

"Santeria Chicken"

"Mini-Clip"

"Mad Cow"

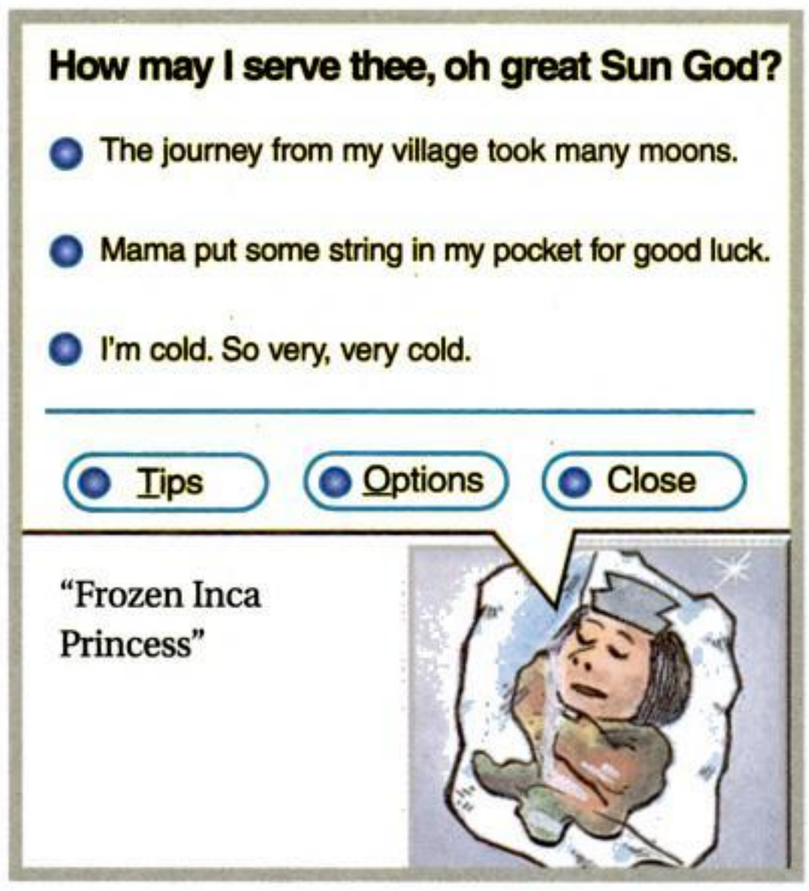
"I Prefer You Call Me *Richard*, Thank You Very Much"


Hey! I'm Cheech! Whaddaya need?
Finish that job we was talkin' about.
Hook you up with that guy we was talkin' about.
What, you need smokes? Baby! It's me, Cheech!
Tips
Options
Close

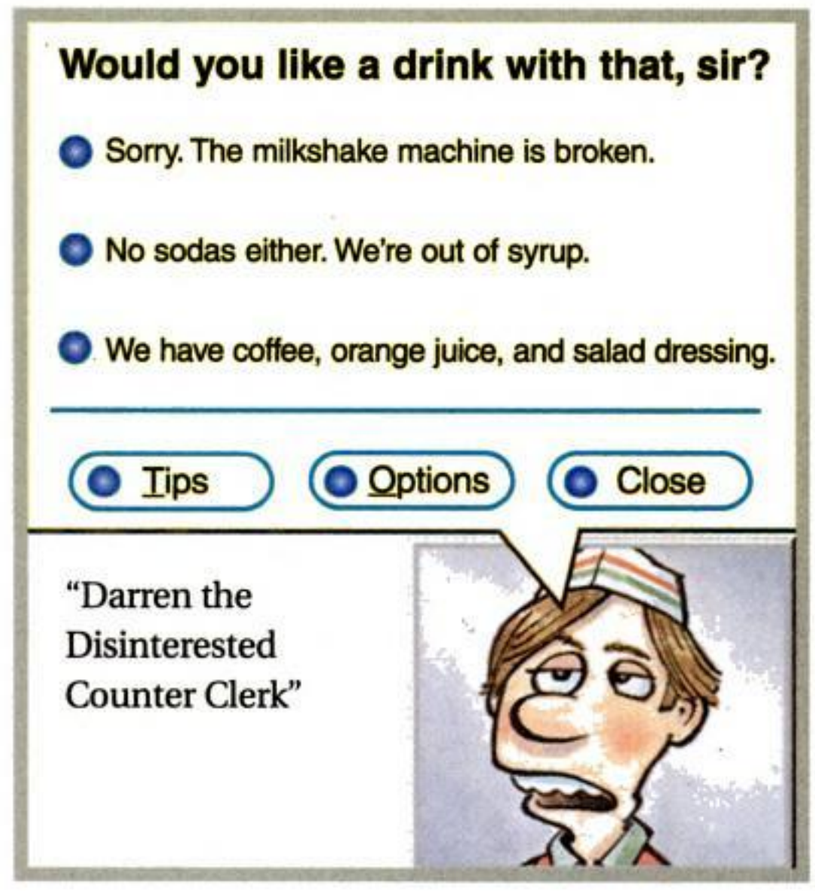
"Cheech"

What's your name? My name is Patrick.
I'm gonna be a fireman... When I get better.
Sometimes Nurse Ellie lets me watch her smoke.
Papa said God gave me icky blood for being bad.
Tips
Options
Close

"Bubble Boy"


How may I serve thee, oh great Sun God?
The journey from my village took many moons.
Mama put some string in my pocket for good luck.
I'm cold. So very, very cold.
Tips
Options
Close

"Frozen Inca Princess"


Would you like a drink with that, sir?
Sorry. The milkshake machine is broken.
No sodas either. We're out of syrup.
We have coffee, orange juice, and salad dressing.
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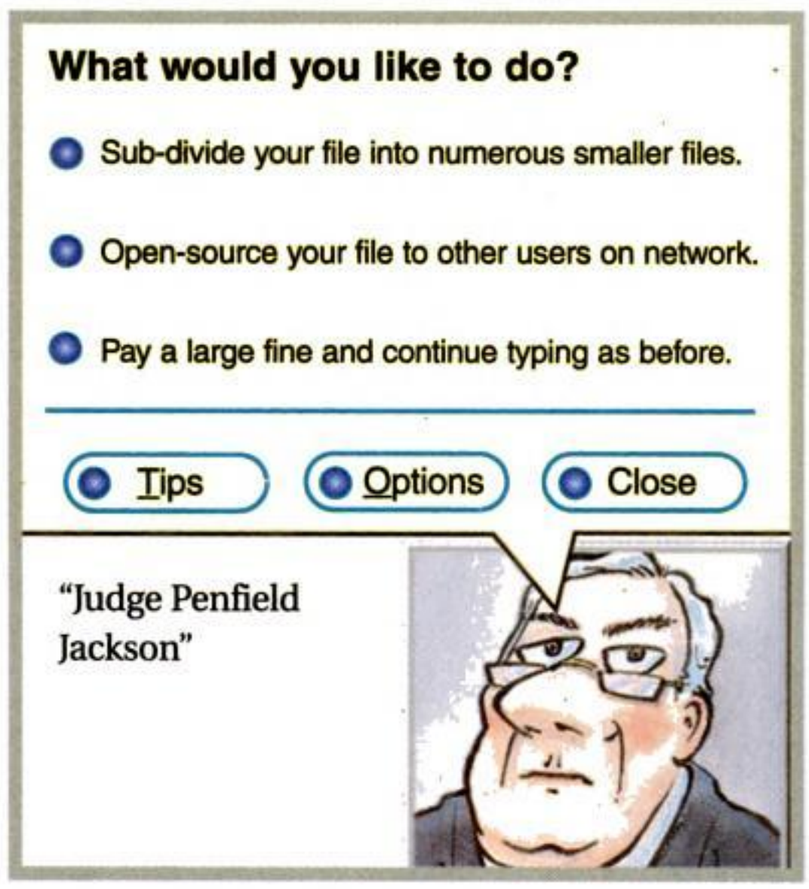
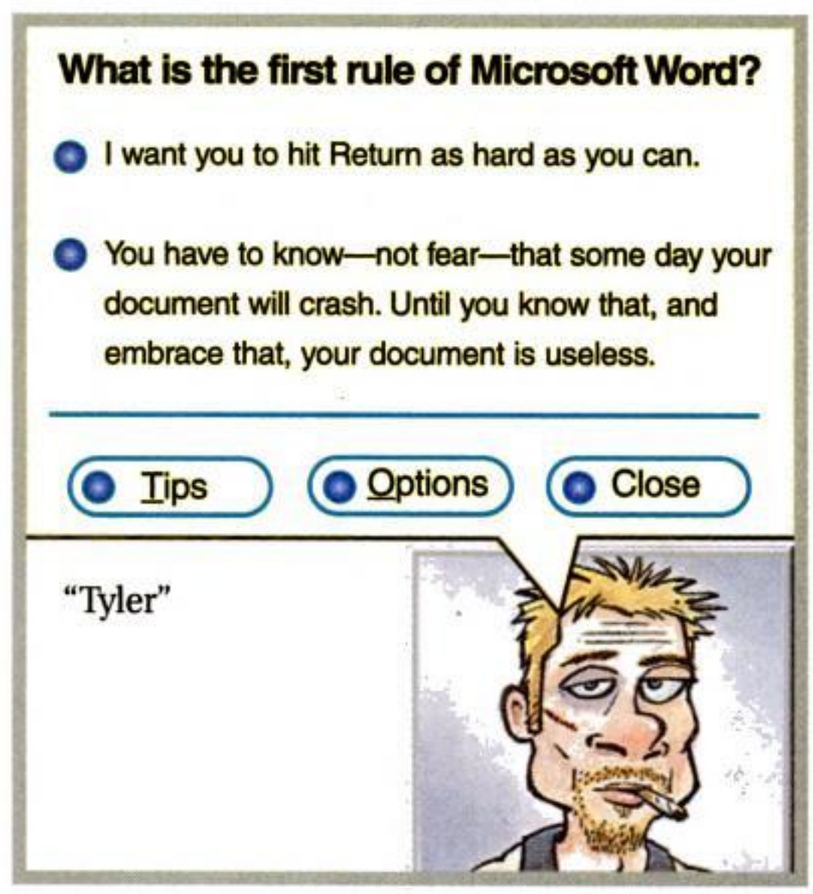
Options
Close

"Darren the Disinterested Counter Clerk"


What would you like to do?
Sub-divide your file into numerous smaller files.
Open-source your file to other users on network.
Pay a large fine and continue typing as before.
Tips
Options
Close

"Judge Penfield Jackson"


What is the first rule of Microsoft Word?
I want you to hit Return as hard as you can.
You have to know—not fear—that some day your document will crash. Until you know that, and embrace that, your document is useless.
Tips
Options
Close

"Tyler"

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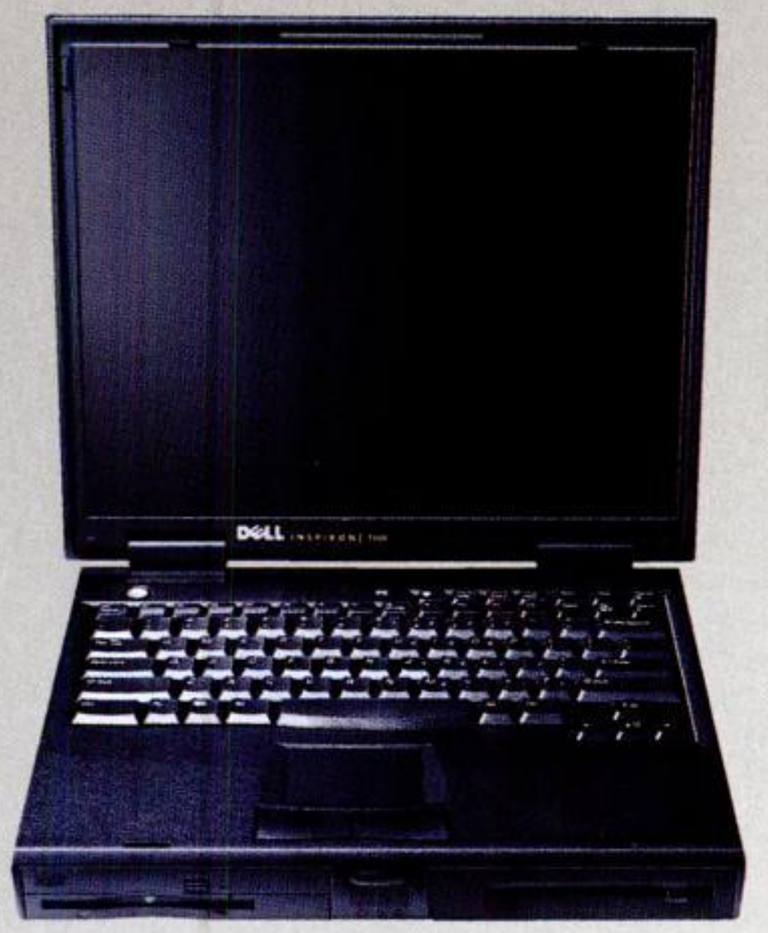

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